1977

Report of the National Marine Fisheries Service for Calendar Year 1977

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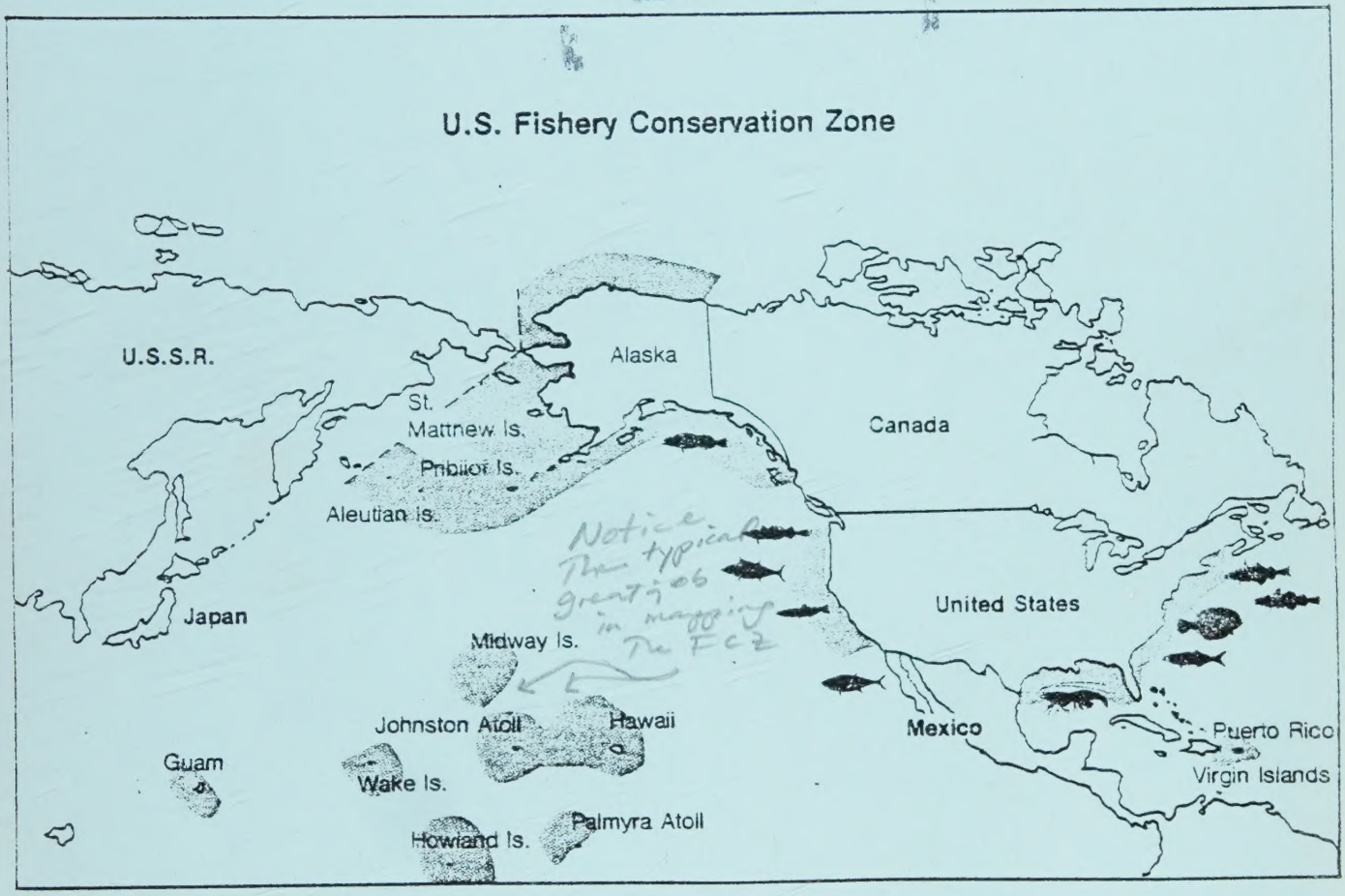

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

COVER: The map is not an official map of the United States Fishery Conservation Zone (FCZ). The latest official description of the FCZ is set forth in the Federal Register (42 FR 12937, March 7, 1977).

Report of the National Marine Fisheries Service for Calendar Year 1977

Washington, D.C.

July 1978

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

National Oceanic and Atmospheric Administration
Richard A. Frank, Administrator

National Marine Fisheries Service
Terry L. Leitzell, Assistant Administrator for Fisheries

THE SECRETARY OF COMMERCE
Washington, D.C. 20230

July 28, 1978

Sirs:

It is my honor to send you the National Marine Fisheries Service Report for Calendar Year 1977 as required by Section 9(a) of the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742h(a)).

The report describes the Service's programs, activities, significant accomplishments, mission, and organization, as well as the status of the U.S. fisheries. The report reflects the progress made in achieving the goals of research, utilization, and management of our marine fisheries resources in the national interest.

Sincerely,

Enclosures

President of the Senate
Speaker of the House of
Representatives

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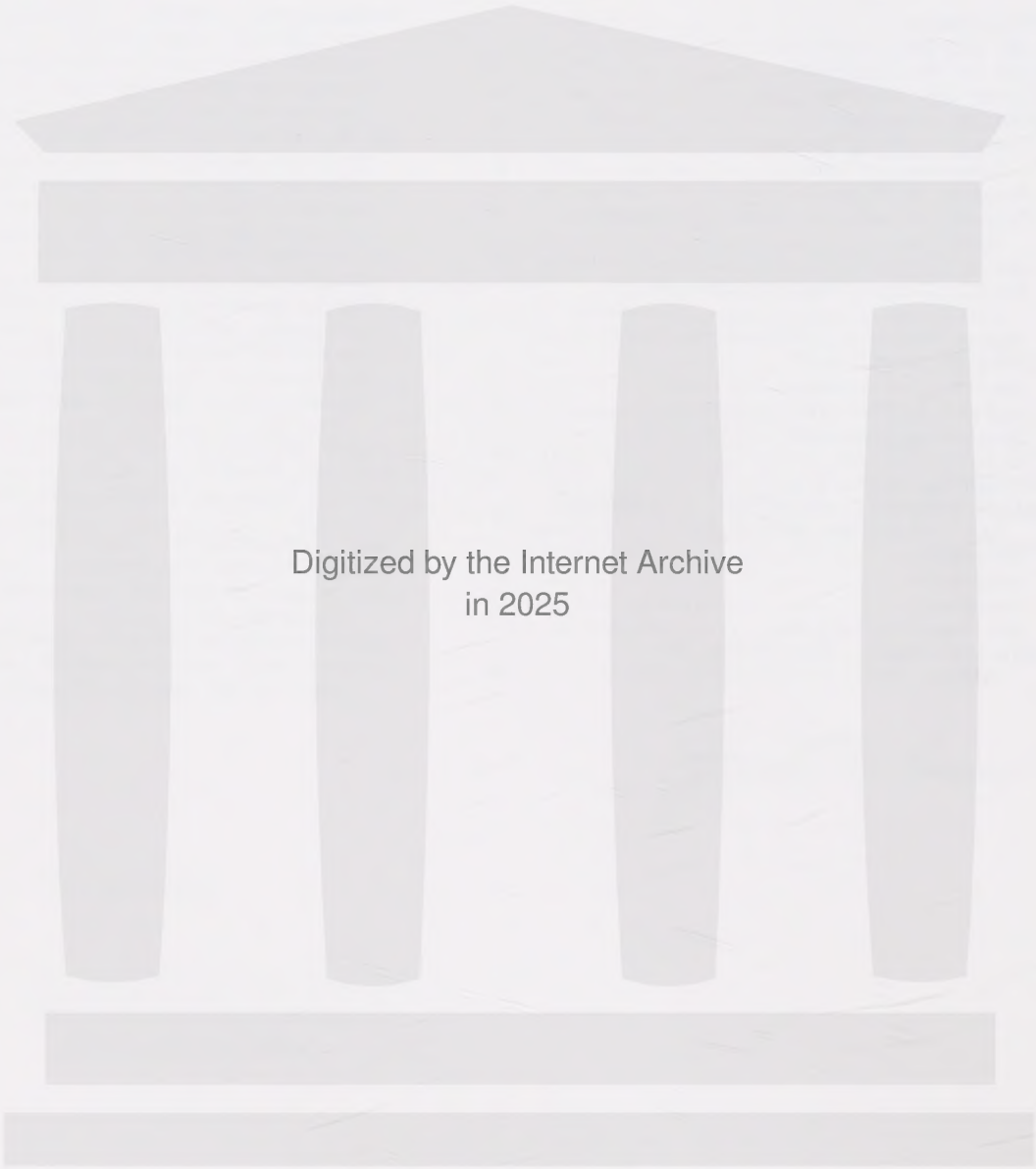

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INTRODUCTION

This report, required by Section 9(a) of the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742h(a)), discusses the programs and activities of the National Marine Fisheries Service (NMFS) for calendar year 1977. It presents (1) status of the U.S. fisheries in calendar year 1977, (2) mission and organization of NMFS, and (3) activities, programs, and significant accomplishments of NMFS.

A NEW ERA FOR FISHERIES

If the United States were an oriental country using the lunar calendar, 1977 would be the "year of the fish." In 1977, fisheries emerged from the shadows of indifference to a place of prominence, concern, and increased interest. The keystone for this is the Fishery Conservation and Management Act of 1976 (FCMA), signed by the President on April 13, 1976. The foreign fishing requirements of FCMA were implemented in March 1977. For the United States, this is a giant step forward in reversing the depletion of our living marine fishery resources that occurred during the past decade in U.S. waters. Simply, the basic motivation for the Act is the conservation, recovery, and wise use of our vast fishery resources. The net result should be economically healthy fisheries that can meet the U.S. demand for fishery products and support satisfactory levels of recreational fishing. The purposes of the Act are to prevent the depletion of our fish stocks through overfishing, to rebuild stocks that have been overfished, and to conserve and manage our fishery resources to develop their full potential.

Fisheries are an important source of protein food. The Act has spurred U.S. fishing interests to take a new look at our extensive fishery resources and to plan to conserve and fully utilize them for the benefit of the Nation and future generations. This new thrust should expand the U.S. fishing industry and provide new opportunities for recreational fishers.

The U.S. fishing industry is receiving governmental encouragement with FCMA providing the major impetus. The Commerce Department is leading the way with a study to identify domestic and foreign markets for a substantial expansion of the U.S. fisheries catch. Resource expansion potential seems to exist because 20 percent of the world's fish are in the protected U.S. 200-mile Fishery Conservation Zone (FCZ). But, both the fishing fleet and fish processing facilities in the United States require major expansion to capitalize on the fish resources potential created by the new Act. Fishing fleet expansion is under way. In 1977, U.S. boatyards increased vessel construction under the Fishing Vessel Obligation Guarantee Program by 50 percent.

Fish processors, however, are still doubtful of the economic opportunities and have not yet committed funds for major new facilities. Expansion of processing, currently accounting for 40 percent of all fishing industry employment, holds the key to the future. Expansion will strengthen the industry and reduce unemployment in fishing communities.

Restrictions on foreign fishing in the U.S. FCZ, without an increase in U.S. fishing and marketing, could seriously affect the food and nutrition industries of fish-protein-dependent countries as well as the fishery products requirements of our country.

There has been progress in the relatively short time that the Act has been in effect, but there have been problems of growing pains because of a new system of management. However, this new management system allows those most affected to have a direct voice in the management regime.

Other sections of this report show what has been accomplished since FCMA was implemented.

STATE OF THE FISHERIES

Foreign and domestic commercial marine catches within 200 nautical miles (nmi) of U.S. shores were 3.8 million metric tons or 8.5

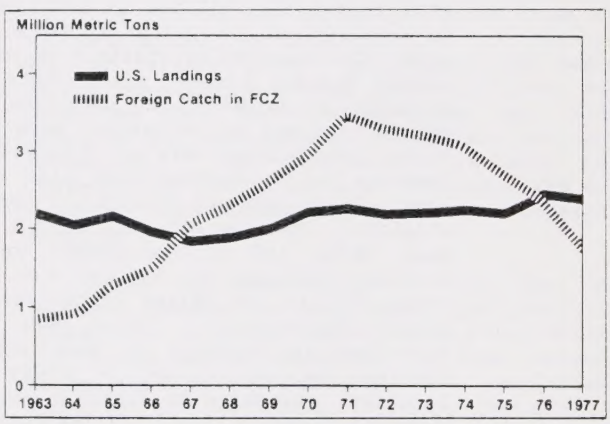

Figure 1.-Total landings by U.S. Commercial fishers at U.S. ports and catches off U.S. shores by foreign fishing vessels in round weight (for mollusks, only the weights of meats are included).

billion pounds (for mollusks, only the weights of meats were included) in 1977, the first year that foreign fisheries were controlled under FCMA (see fig. 1). Although the commercial

catch was down 14 percent in 1977, the U.S. share rose from 48 percent in 1976 to 56 percent in 1977. If the catch by U.S. recreational fishers is added, the U.S. share of the total marine catch would have been larger.

About 60 percent of U.S. catches in marine waters was taken in the Territorial Sea (0-3 nmi). All of the foreign catch, however, was caught in the U.S. FCZ, from 3 to 200 miles off U.S. shores. In 1977, foreign vessels took 70 percent of the total catch in the U.S. FCZ, down from 76 percent in 1976.

U.S. commercial freshwater and marine fishery landings by domestic fishers at ports in the United States were 5.2 billion pounds or 2.4 million metric tons round weight (for mollusks, only the weights of meats were included), valued at a record $1.5 billion in 1977. The quantity landed in 1977 was 3 percent less than that in 1976; the value, however, was 12 percent more. The principal reason for the decrease in quantity was a decline in landings for industrial purposes.

In addition, U.S.-flag vessels also landed tuna, bonito, and shrimp at ports outside the United States. In 1977, those landings were 123.8 million pounds of tuna and bonito (valued at $45.9 million), landed principally in Puerto Rico; and 15.4 million pounds of shrimp (valued at $26.9 million), landed at Caribbean ports. Catches and landings by U.S. flag vessels and fishers totaled over 5.3 million pounds (valued at almost $1.6 billion).

Commercial landings of edible species in the United States were 2.9 billion pounds valued at a record $1.4 billion in 1977, up 5 percent in quantity and 11 percent in value compared to 1976. The quantity of edible fish and shellfish landed was the largest since 1951. Increases occurred principally in shellfish landings--shrimp landings up 18 percent were at a record high; clam landings were up 19 percent; and crab landings up 16 percent were also at a record high. Total landings of edible finfish declined slightly. Landings of tuna at U.S. ports were down about 140 million pounds or almost 30 percent; landings of tuna by U.S. fishers at ports outside the United States also were down almost 30 percent. There were substantial increases in landings of some other finfish species, but not enough to offset lower tuna landings. Landings of Atlantic cod were up 35 percent; haddock, up 123 percent; Atlantic pollock, up 20 percent; and Atlantic ocean perch and salmon, both up 9 percent.

Commercial landings at U.S. ports of fish used for reduction to meal and for other industrial purposes were 2.3 billion pounds valued at $111 million in 1977, down 11 percent in quantity, but up 25 percent in value as compared with 1976. The decline was due to smaller landings of menhaden and anchovies.

In 1977, the foreign catch of fish (excluding tunas) and shellfish in the U.S. FCZ was 1.7 million metric tons, about 414,000 tons short of allocations granted by the United States. The 1977 total foreign catch was down 27 percent from the 2.3 million metric tons caught in 1976. The U.S. FCZ off Alaska was by far the most important source of foreign catch and Alaska pollock was the single most important species. Pollocks and other fishes accounted for 96 percent of the total foreign catch; squids and other shellfishes accounted for the rest. Japan had the greatest foreign catch, accounting for 66 percent of the total; U.S.S.R., 22 percent; and Republic of Korea, 5 percent. In all, 12 foreign nations reported catches in the U.S. FCZ in 1977.

Marine recreational fishery landings for the United States in 1970 (the most recent year for which data are available) totaled an estimated 1.6 billion pounds of marine (saltwater) finfish, or about the same as the average amount of edible finfish landed by commercial fishers in recent years.

World fishery landings in 1976 (the most recent year for which data are available) of 73.5 million metric tons (162 billion pounds) were up 5 percent from 1975. Japan was the leading nation with slightly over 14 percent of the total. The U.S.S.R. was a close second with almost 14 percent; Peoples Republic of China (Peking) accounted for 9 percent; Peru, 6 percent; Norway, 5 percent; and United States, 4 percent.

During 1977, U.S. exvessel prices (paid to fishers and vessels) for most species rose. Prices were up for menhaden, salmon, tuna, clams, and crabs, but down slightly for New England finfish. The monthly average index of exvessel prices of shrimp in December 1977 was 25 percent lower than in January 1977.

The total value of U.S. production of processed fishery products was $3.9 billion in 1977, about 11 percent more than in 1976. The value of edible products increased to $3.5 billion, up 13 percent from 1976. The value of all categories of edible products increased, including fresh and frozen, canned, and cured. The value of industrial products, on the other hand, declined to $372 million in 1977, down 5 percent as compared with 1976. The cause of this decline was a sharp reduction in the value of production of canned animal food.

The total value of U.S. imports of edible and industrial fishery products was a record $2.6 billion in 1977, up 12 percent for 1976. The value of imports of edible products, which comprised 79 percent of the total, rose slightly. The quantity of edible products, however, was 2.2 billion pounds for both years. Imports of fresh and frozen fillets and shrimp, and canned tuna and sardines declined, but

imports of fresh and frozen tuna, blocks and slabs, and sea scallops increased. Imports of fish meal were 163.0 million pounds valued at $26.5 million in 1977, down 42 percent in quantity and 19 percent in value as compared with 1976.

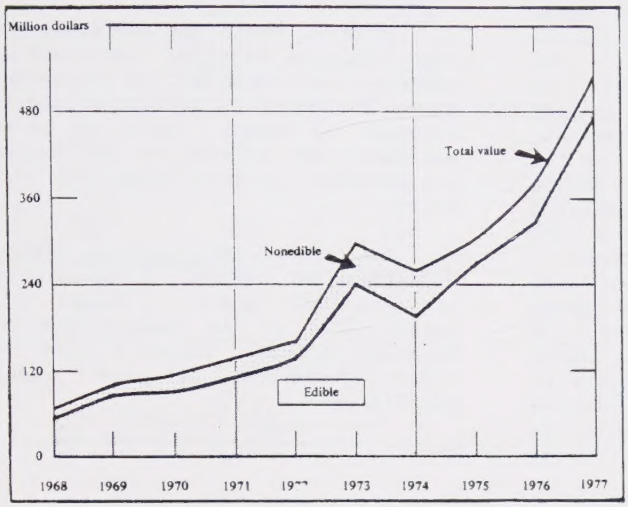

Figure 2.-Value of U.S. exports of domestic fishery products, 1968-77.

Total U.S. exports of domestic products were a record $520.5 million, up 35 percent from 1976. All of the increase was in edible products which reached 331.1 million pounds valued at $473.4 million, up 37 percent in quantity and 44 percent in value from 1976. (See fig. 2.)

The U.S. supply of both edible and industrial commercial fishery products (domestic landings plus imports, round-weight equivalent)

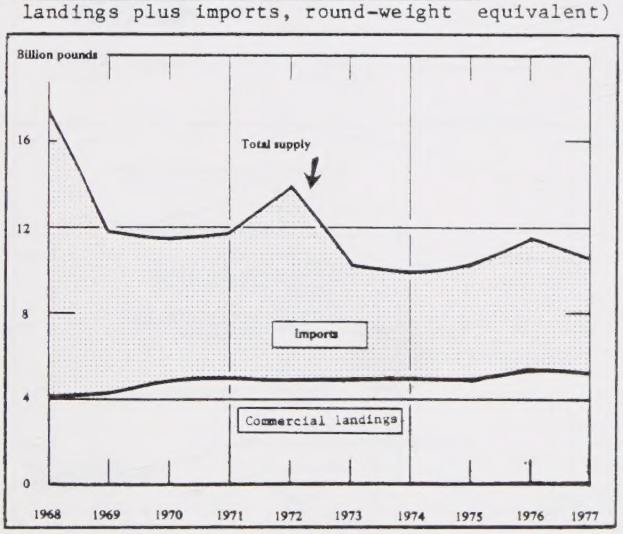

Figure 3.-U.S. supply of edible and industrial fishery products, 1968-77.

was 10.6 billion pounds in 1977--a decrease of 8 percent as compared with 1976. (See fig. 3.)

Because of near-record domestic landings of edible fish and shellfish together with continued high imports, the supply of edible products was a record 7.4 billion pounds. The supply of industrial products was 3.2 billion pounds, the lowest since 1957.

In 1977, U.S. per capita consumption of fishery products was 12.8 pounds of edible meat per person, down slightly from the record 13.0 pounds in 1976.

MISSION AND ORGANIZATION

The NMFS mission for meeting the goals and objectives for our living marine resources consists of six national programs: (1) fisheries management--conserving and managing living marine resources under FCMA, marine mammals, endangered species, and collecting information to administer those objectives; (2) habitat conservation--conserving, restoring, enhancing fish habitats; (3) fisheries development--developing and maintaining a healthy commercial fishing industry; (4) product quality, safety, and identity--assuring the safety, quality, and proper identity of the supply of fishery products for U.S. consumers; (5) aquaculture--encouraging the development of public and private aquaculture for selected species of fish; and (6) marine recreation--strengthening the contribution of marine resources to recreation and other social needs. NMFS conducts research and provides services to protect, manage, and rationally use our living marine resources for their economic, recreational, and aesthetic value. Programs and projects for living marine resources focus on (1) determining how those resources are affected by the varying natural environment and man's activities; (2) fostering their efficient and judicious use; and (3) providing for their domestic and international management, use, and protection. In 1976, NMFS realined its organization and functions to administer new and expanded responsibilities in fishery management mandated by FCMA.

Since its establishment 7 years ago, the National Oceanic and Atmospheric Administration (NOAA), the principal Federal agency responsible for living marine resources, has been assigned increasing responsibilities for regulating, managing, and protecting the living resources of the sea, which are primarily under the purview of NMFS. The statutes that have expanded NOAA's role--such as FCMA, Marine Mammal Protection Act of 1972, and Endangered Species Act of 1973--do not provide authority for modifying the management structure of NOAA in accordance with its expanded mission. NOAA has become involved in a wide range of policy decisions of a sensitivity far greater than originally contemplated, such as resource management and protection decisions vitally affecting the

entire U.S. fishing industry, including the tuna fleet and Indian and non-Indian salmon fishing in the Pacific Northwest. As a result, the duties of senior NOAA fishery officials have substantially changed. Therefore, in the latter part of 1977, NOAA underwent a major reorganization to put more emphasis on ocean programs. The new NOAA structure became effective in early November 1977. The realinement established, among others, an Office of Fisheries (OF)/National Marine Fisheries Service (NMFS) headed by an Assistant Administrator for Fisheries. This is an amalgamation of NOAA's Office of Marine Resources (and all of its fishery-related activities) with NMFS. Therefore, the new Office of Fisheries (a major line component of NOAA) and the major program elements reporting to it make up the expanded NMFS. The agency name, "National Marine Fisheries Service," is retained. The realinement establishes a single line management position reporting directly to the Administrator of NOAA. This assures effective direction of fishery programs in the sensitive environment that exists today.

The Assistant Administrator for Fisheries and his staff formulate basic fishery policy, execute policy decisions, and allocate and manage NMFS resources. Figure 4 presents the headquarters structure prior to the NOAA reorganization.

OF/NMFS, which the Assistant Administrator for Fisheries directs, comprises about 1,800 permanent full-time and 600 other-than-full-time personnel (about 14 percent of the total number employed by NOAA). About 85 percent of the employees are located in the Regional Offices and Research Centers along the coasts of our Nation.

The five NMFS Regional Offices provide direction and control of national programs at the regional level. Figure 5 shows the relationship of the headquarters staff to the Regional Offices. Figure 6 shows NMFS Regions, their boundaries, and the principal field facilities.

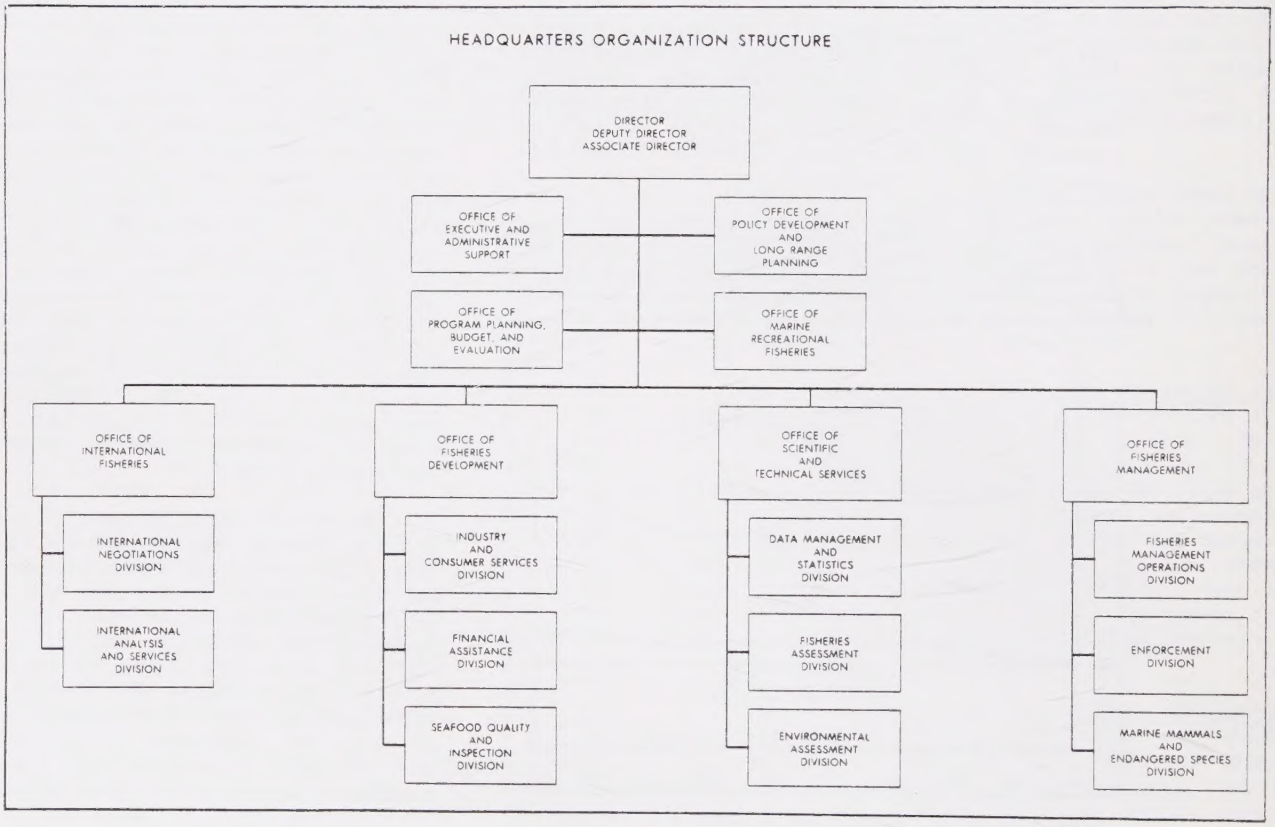
HEADQUARTERS ORGANIZATION STRUCTURE
DIRECTOR
DEPUTY DIRECTOR
ASSOCIATE DIRECTOR
OFFICE OF EXECUTIVE AND ADMINISTRATIVE SUPPORT
OFFICE OF POLICY DEVELOPMENT AND LONG RANGE PLANNING
OFFICE OF PROGRAM PLANNING, BUDGET, AND EVALUATION
OFFICE OF MARINE RECREATIONAL FISHERIES
OFFICE OF INTERNATIONAL FISHERIES
INTERNATIONAL NEGOTIATIONS DIVISION
INTERNATIONAL ANALYSIS AND SERVICES DIVISION
OFFICE OF FISHERIES DEVELOPMENT
INDUSTRY AND CONSUMER SERVICES DIVISION
FINANCIAL ASSISTANCE DIVISION
SEAFOOD QUALITY AND INSPECTION DIVISION
OFFICE OF SCIENTIFIC AND TECHNICAL SERVICES
DATA MANAGEMENT AND STATISTICS DIVISION
FISHERIES ASSESSMENT DIVISION
ENVIRONMENTAL ASSESSMENT DIVISION
OFFICE OF FISHERIES MANAGEMENT
FISHERIES MANAGEMENT OPERATIONS DIVISION
ENFORCEMENT DIVISION
MARINE MAMMALS AND ENDANGERED SPECIES DIVISION

Figure 4.-NMFS Headquarters organization structure prior to appointment of Acting Assistant Administrator for Fisheries in November 1977, and prior to the implementation of organizational changes planned for 1978.

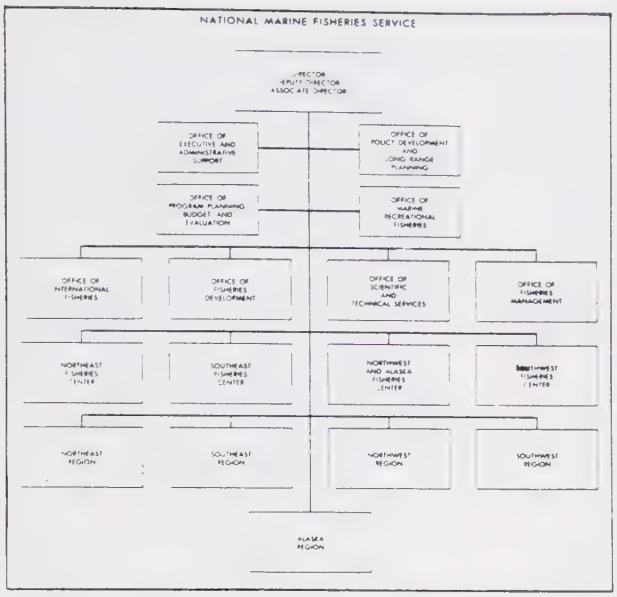

Figure 5.-NMFS organization structure prior to the appointment of the Acting Assistant Administrator for Fisheries in November 1977 and prior to the implementation of organizational changes planned for 1978.

Northeast Fisheries Center Woods Hole, Massachusetts	Southeast Fisheries Center Miami, Florida
Woods Hole Laboratory Woods Hole, Massachusetts	Miami Laboratory Miami, Florida
Narragansett Laboratory Narragansett, Rhode Island	Pascagoula Laboratory Pascagoula, Mississippi
Gloucester Laboratory Gloucester, Massachusetts	Galveston Laboratory Galveston, Texas
Sandy Hook Laboratory Highlands, New Jersey	Panama City Laboratory Panama City, Florida
Milford Laboratory Milford, Connecticut	National Fish. Engineering Lab. Bay St. Louis, Mississippi
Oxford Laboratory Oxford, Maryland	Port Aransas Laboratory Port Aransas, Texas
National Systematics Laboratory Washington, D.C.	Beaufort Laboratory Beaufort, North Carolina
Atlantic Environmental Group Narragansett, Rhode Island	College Park Laboratory College Park, Maryland

Southwest Fisheries Center La Jolla, California	Northwest and Alaska Fisheries Center Seattle, Washington
La Jolla Laboratory La Jolla, California	Seattle Laboratory Seattle, Washington
Tiburon Laboratory Tiburon, California	Auke Bay Laboratory Auke Bay, Alaska
Honolulu Laboratory Honolulu, Hawaii	Kodiak Laboratory Kodiak, Alaska
Pacific Environmental Group Monterey, California	

Figure 7.-NMFS Fisheries Centers and their component units.

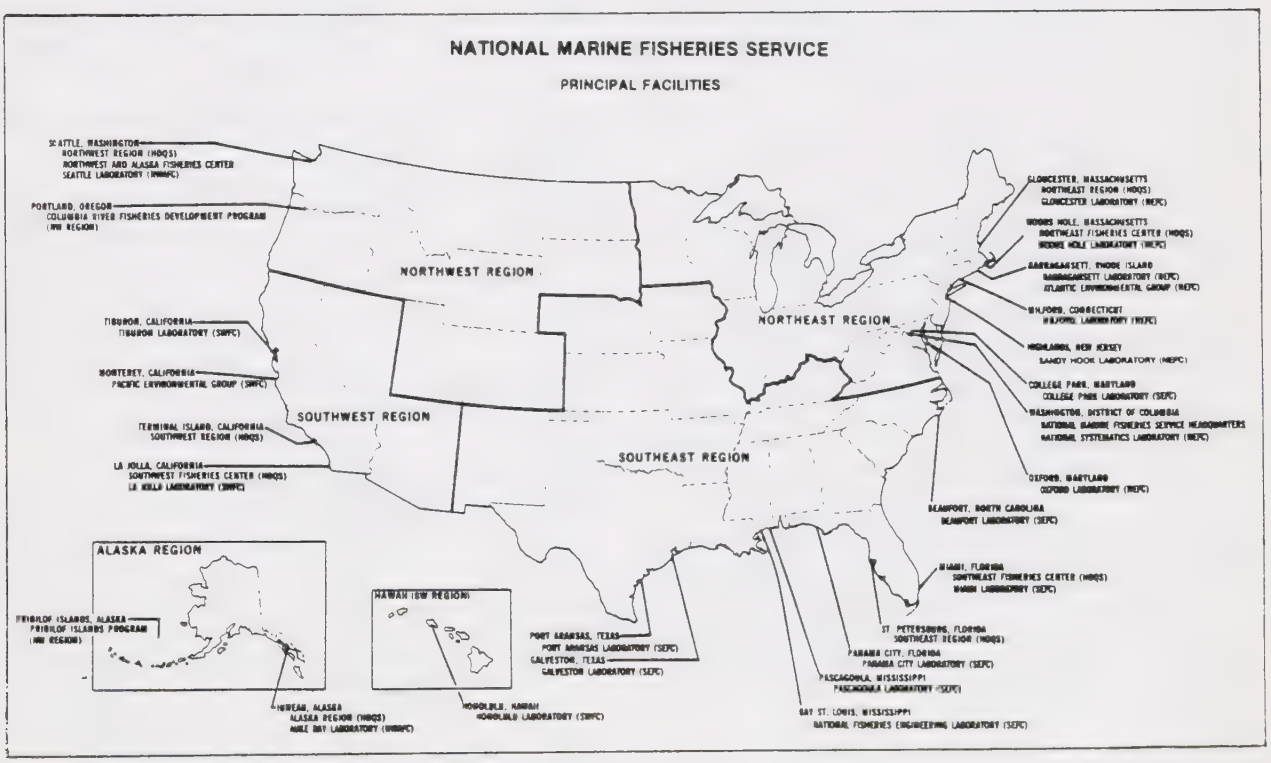

Figure 6.-NMFS Regions and the principal field facilities.

Four regional fisheries research centers (see fig. 7) conduct (1) biological/environmental research, (2) fishery utilization research, and (3) socioeconomic research (required to develop fishery management plans under FCMA). In addition, the four centers also provide scientific research support to the Regional Fishery Mangement Councils established by FCMA.

Many fishery management functions stemming from extended jurisdiction are regional responsibilities. Regional Offices provide technical and administrative support to the Regional Fishery Management Councils and Regional Directors serve as Members of the Councils.

FISHERIES MANAGEMENT

NMFS develops broad criteria and guidelines for managing fisheries as a national resource, and fosters State-Federal fishery management cooperation and integration of efforts for multijurisdictional fisheries. Also, NMFS administers and implements the Fishery Conservation and Management Act of 1976 (FCMA)--Public Law 94-265, U.S.C. 1801 et seq. The new law gives the Federal Government authority to regulate the vast fishery resources that are found within 3-200 miles of the U.S. coast--an area comprising about 2 million square miles. FCMA establishes a management regime different from anything that the Federal Government has encountered in the past. Eight Regional Fishery Management Councils, set up by the Act, are responsible for preparing Fishery Management Plans (FMPs) for the stocks of fish off our coasts, which are subject to the approval of the Department of Commerce. Each of the Councils has a scientific and technical committee to review technical matters and an advisory committee to make recommendations on the strategy for managing each fishery. These committees develop the FMPs that define how much of each species may be caught, who may catch it, what records must be kept, and other matters necessary for regulating the fishery. NMFS reviews the FMPs for conformance with national standards under FCMA. After approval by the Secretary of Commerce, NMFS implements and issues the FMPs, and with the U.S. Coast Guard enforces appropriate regulations. NMFS provides scientific, socioeconomic, and other types of data to the Council committees so that they can formulate the FMPs. Development of effective FMPs is a complex and lengthy process. The Regional Fishery Management Councils and NMFS work together to improve ways in which plans may be developed and approved more rapidly and efficiently.

FOREIGN FISHING IN THE U.S. FISHERY CONSERVATION ZONE (FCZ)

The major thrust in 1977 was bringing foreign fishing in the 200-mile FCZ off the U.S. coast under control in accordance with FCMA. This was accomplished by developing and implementing Preliminary Fishery Management Plans (PMPs). These PMPs regulate the amount of fish that foreign fishers can harvest from our waters. Anticipating the receipt of foreign fishing permit applications prior to March 1, 1977, PMPs were prepared by NMFS to identify that portion of the optimum yield (OY) for each fishery resource that would not be harvested by domestic fishers and that thus constitutes the total allowable catch by foreign fishers (TALFF).

o The following 13 PMPs were issued and implemented in 1977:

1. Trawl Fisheries of Washington, Oregon and California;
2. Sablefish Fishery of the Eastern Bering Sea and Northeastern Pacific;
3. Trawl Fishery of the Gulf of Alaska;
4. Trawl Fisheries and Herring Gillnet Fishery of the Eastern Bering Sea and Northeast Pacific;
5. Seamount Groundfish Fishery of the Pacific;
6. Snail Fishery of the Eastern Bering Sea;
7. Hake Fisheries of the Northwestern Atlantic;
8. Mackerel Fishery of the Northwestern Atlantic;
9. Squid Fisheries of the Northwestern Atlantic;
10. Atlantic Herring Fishery of the Northwestern Atlantic;
11. Foreign Trawl Fisheries of the Northwestern Atlantic;
12. King and Tanner Crab Fisheries of the Eastern Bering Sea; and
13. Shrimp Fishery of the Eastern Bering Sea and Gulf of Alaska.

These plans contain individual species quotas, a variety of time-area closures, gear restrictions, effort limitations, allowable incidental catch rates, and other restrictions

designed to permit foreign fishers to fish only a designated portion of the preliminary OY. Implementation of these plans in 1977 minimized the impact of foreign fisheries on stocks important to our domestic fishers. As a result, in 1977, the 1.7 million metric tons harvested by foreign fishers was about 600,000 metric tons less than the 1976 foreign catch and about half that of the peak in 1974. The actual catch in 1977 was about 400,000 metric tons less than the foreign fishing quota for the year. Additionally, the number of foreign fishing and support vessels (fewer than 780) off our coasts in 1977 dropped to about one-third of the vessels fishing in 1976 and 1975.

o During the latter part of the year, all of the PMPs, except for "King and Tanner Crab Fisheries of the Eastern Bering Sea" and "Shrimp Fishery of the Eastern Bering Sea and Gulf of Alaska" were reviewed and, where necessary, modified for use in 1978.

DOMESTIC FISHING

PMPs developed by the Secretary of Commerce, will eventually be replaced by Fishery Management Plans (FMPs) developed by the Councils. FMPs are similar to PMPs, but regulate domestic as well as foreign fishing within 3-200 miles of the U.S. coast. The Councils are aggressively preparing FMPs.

o Six FMPs were submitted in 1977 by the Councils for approval by the Secretary of Commerce. The following three FMPs were approved and implemented:

1. Atlantic Groundfish--submitted by the New England Fishery Management Council (amended twice during 1977 by emergency regulations promulgated by the Secretary). It covers cod, haddock, and yellowtail flounder in the waters of the North Atlantic;

2. Surf Clam and Ocean Quahog Fisheries--submitted by the Mid-Atlantic Fishery Management Council; and

3. Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California--submitted by the Pacific Fishery Management Council (changed twice by Council amendments approved by the Secretary). It covers salmon in the North Pacific off our Northwest Coast.

Three additional FMPs were under review by the Secretary at the end of the year:

1. Tanner Crab off Alaska--submitted by the North Pacific Fishery Management Council;

2. Commercial Troll Fisheries off the Coast of Alaska--submitted by the North Pacific Fishery Management Council; and

3. Gulf of Alaska Groundfish Fishery during 1978--submitted by the North Pacific Fishery Management Council. It covers flounder, sole, and rockfish in the Gulf of Alaska.

Another 35 FMPs were in various stages of preparation by the end of 1977.

o To implement the various PMPs and FMPs, foreign and domestic fishing regulations were promulgated by the Secretary describing conditions and restrictions, procedures for issuance of permits, catch quotas, and vessel identification and reporting requirements. Regulations implementing FMPs apply to both foreign and domestic fishing. The initial impact of FCMA was felt by foreign fishers; however, by the end of 1977 domestic fishers were also being affected as FMPs were issued to replace PMPs.

o Concurrently with development of plans, other accomplishments in fishery management include:

1. Over $11 million in foreign fishing fees was collected from 13 different nations;

2. A total of 358 notices of serious violations was issued to foreign and domestic fishers;

3. A program to place U.S. observers on foreign fishing vessels was established and a goal of 20 percent surveillance coverage achieved; and

4. The 2.1-million-ton foreign fishing allocation for 1977 was reduced to 1.9 million tons in 1978.

SUPPORT OF REGIONAL FISHERY MANAGEMENT COUNCILS

This was the first full year of operation for the Regional Fishery Management Councils established by FCMA. Although NMFS is responsible for the overall administration and implementation of FCMA, the Agency works and cooperates with the Councils to achieve the goals of the Act.

o A monthly information bulletin (Council Memorandum) was started in January 1977 to cover matters of interest to the Councils. This sets up a communication link with the Councils in order to provide them with guidance and information from the national level. The Memorandum includes monthly highlights of the Councils' activities, operations, and meetings.

o NMFS provided administrative support and staff work to:

1. Maintain adequate Council membership by expediting appointments of designated candidates by the Secretary;

2. Issue the appropriate security clearances to members of the Councils;

3. Aid in setting up major meetings and workshops to resolve problems in implementing FCMA;

4. Handle the publication (in accordance with established regulations) of notices of Council meetings in the Federal Register;

5. Prepare and disseminate required reports in accordance with the Federal Advisory Committee Act;

6. File the appropriate charters that authorize the operation of all entities of the Councils (e.g., Advisory Panels); and

7. Amend regulations to clarify those sections of the Act that need further interpretation.

LAW ENFORCEMENT

Consonant with the national goal to conserve and manage living resources, NMFS Special Agents enforce a wide variety of Federal laws and regulations as well as provisions of various international treaties and agreements. In 1977, NMFS enforcement responsibilities increased significantly with the passage of FCMA.

The major enforcement is directed at commercial fishing (see fig. 8). Regulations promulgated under FCMA in several regions apply to both domestic and foreign fishing.

To assure compliance with some domestic regulations, NMFS Special Agents inspect U.S. vessels, fishing gear, logbooks, vessel landings, and fish-handling facilities. These inspections are conducted for the most part on the docks because enforcement costs can be minimized by enforcing ashore rather than at sea.

Figure 8-NMFS Special Agent aboard U.S. gillnet fishing vessel. Captain of this vessel was cited to U.S. District Court for fishing in violation of International Pacific Salmon Fishery Commission regulations.

Enforcement at sea is carried out in cooperation with the U.S. Coast Guard (USCG) (see fig. 9). Enforcement and surveillance patrols conducted by the U.S. Coast Guard are frequently accompanied by NMFS Special Agents when available, and especially when a particular aerial or surface patrol requires the presence of a trained enforcement and fisheries expert. To enforce the provisions of the various laws, treaties, and agreements, the agents inspect both foreign and domestic fishing vessels at sea. Table 1 summarizes NMFS-USCG enforcement activities for 1977.

U.S. observers are placed on foreign fishing vessels operating in the North Pacific and Alaska waters and in Northwest Atlantic waters. The observers collect data on total catch, its composition, level of fishing efforts, gear utilization, catch disposition, marine mammal catch, and biological sampling. They also monitor compliance with foreign fishing regulations by fishing fleets of nations licensed to operate in the U.S. 200-mile FCZ. Although an overall coverage level of 20 percent of the fleets operating in U.S. waters was

Table 1.--Fisheries enforcement, January 1, 1977 to December 31, 1977

Region	Domestic sightings	Foreign sightings	Foreign boardings	Domestic reports of violations 1/	Foreign reports of violations 1/	Domestic citations	Foreign citations	Seizures
				-Number-				
Northeast	3,958	4,927	512	191	105	116	271	1
Northwest	3,251	1,525	104	36	3	12	7	--
Alaska	1,730	4,644	730	--	27	--	50	1
Southeast	5,616	1,638	56	--	--	--	--	1
Southwest	117	678	72	3	3	--	--	--
TOTAL	14,672	13,412	1,474	230	138	128	328	3

1/ Some violations later downgraded to citations included.

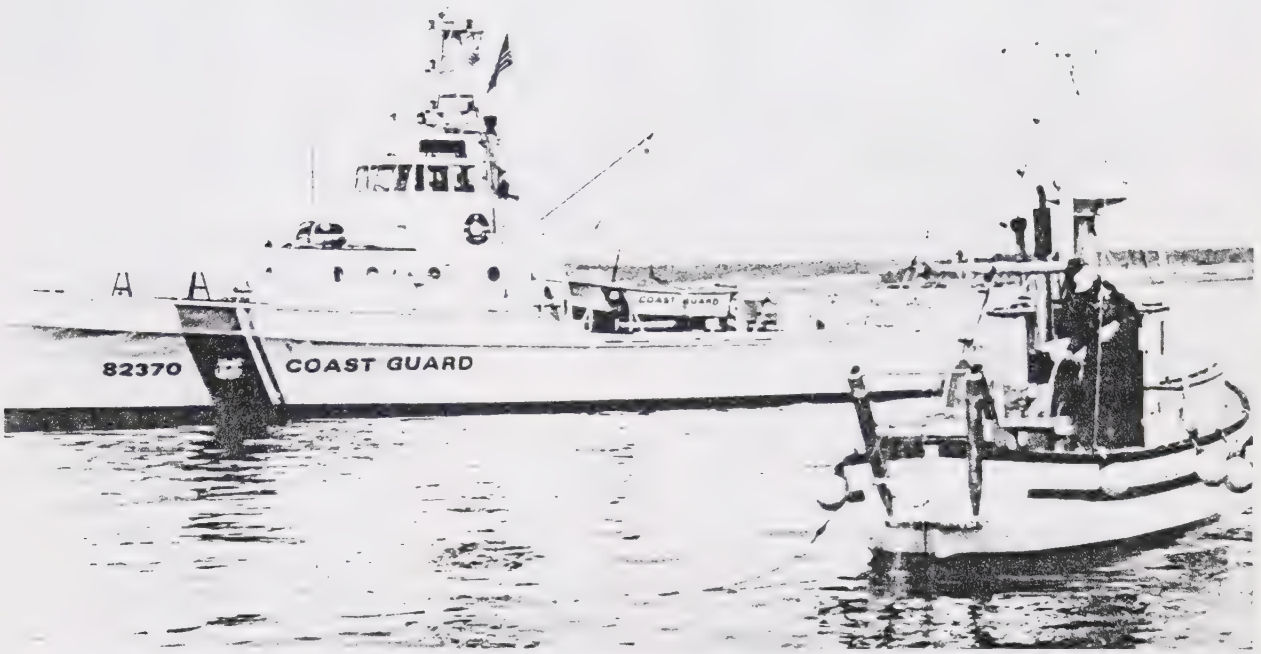

Figure 9.-U.S. Coast Guard cutter with NMFS Special Agents aboard observing U.S. gillnet fishing vessel in International Pacific Salmon Fishery Commission area. (Note salmon in the net.)

planned for 1977, the observer coverage was about 40-75 percent for foreign fishing vessels harvesting hake and squid and just under 60 percent for vessels fishing herring. The latter good coverage was due to the absence of herring within the specified fishing area in the North Atlantic and the resulting small number of vessels searching for the elusive herring schools.

NMFS is responsible for processing each Report of Violation issued under FCMA through the Administrative Penalty Process. This lengthy, resource-consuming procedure will grow as the number of FMPs increases.

One primary goal of surveillance is to gather information on technological development, innovations, and trends in foreign fishing off U.S. coasts. Surveillance data are especially useful in monitoring the accuracy of catch reports submitted by foreign governments or vessels. The detection of certain types of violations is often greatly facilitated by aerial surveillance. Despite extensive aerial and surface patrols, violations of the many regulations governing fishing off our coasts continue.

In addition to fishery laws, NMFS Special Agents enforce a variety of Federal statutes: (1) The Lacey Act and Black Bass Act that prohibit the importation and interstate trafficking in illegally taken fish and wildlife; and (2) the Marine Mammal Protection Act and Endangered Species Act that prohibit, among other things, the killing, capturing, harassing, and importing of certain marine mammals, sea turtles, fish, and other creatures. Reports of alleged violations of the latter two Acts are frequently received from the public, protectionist organizations, and other law enforcement agencies. Investigating these complaints consumes some of NMFS' enforcement resources.

Living marine resources and activites vary from region to region. Accordingly, enforcement activities show geographic differences. Most of

the enforcement work in the Northeast is directed at both foreign and domestic fishing activities. Alaska is concerned primarily with foreign fishing. The Southeast Region administers the United States-Brazil Shrimp Fishing Agreement, but the majority of the work in that region concerns enforcement of the Marine Mammal Protection Act and Endangered Species Act. Enforcement of these two Acts and regulations on the yellowfin tuna fishery are important to the Southwest Region. One of the primary enforcement functions of the Northwest Region is the protection of salmon stocks under the terms of FCMA regulations, international agreements, and a Federal court order. In the Northwest Region, NMFS and USCG jointly provide salmon enforcement under the requirements of the International Pacific Salmon Fisheries Commission regulations owing to the withdrawal of the State of Washington. NMFS and USCG jointly provide enforcement of State fishery regulations pursuant to a Federal Court order. (A State Supreme Court order prohibits the State of Washington from enforcing any regulations regarding the allocation of resources between Indian and non-Indian fishers.)

STATE-FEDERAL JOINT PROGRAM AND RELATIONS

State-Federal joint programs are another key element in our national management programs. NMFS administers three programs that are particularly active in this area: The Commercial Fisheries Research and Development Act of 1964 (Public Law 88-309 as amended, 16 U.S.C. 779-779f); the Anadromous Fish Conservation Act of 1965 (Public Law 89-304 as amended, 16 U.S.C. 757a.f.); and its own initiative, the State-Federal Fisheries Management Program.

The Commercial Fisheries Research and Development Act of 1964 authorizes NOAA to make grants to the 50 States, the Commonwealth of Puerto Rico, and the governments of the Virgin Islands, Guam, and American Samoa and the Trust Territories of the Pacific to carry out research and development of commercial fishery resources. States are reimbursed up to 75 percent of the cost for these projects and funds are distributed based on a legislative formula.

The Anadromous Fish Conservation Act of 1965 authorizes the Secretary to enter into agreements with the 31 States bordering the oceans and the Great Lakes, and with other non-Federal interests, to conserve, develop, and enhance the anadromous fishery resources of the Nation and fish in the Great Lakes that ascend streams to spawn, and to control the sea lamprey.

The State-Federal Fisheries Management Program (SFFMP) started by NMFS in 1971, assists the coastal States to establish effective management of interstate fisheries within the territorial sea. The goal of the SFFMP is to complement, and where necessary, augment activities under FCMA to develop and implement FMPs for interstate fisheries within the territorial sea. The approach is to (1) work with States and Interstate Marine Fisheries Commissions through State-Federal fisheries management boards to identify and set priorities for fisheries in the territorial sea suitable for management plan development; (2) provide financial support to the States through contracts for specific studies leading to plan development and implementation; and (3) provide financial support to the Interstate Commissions to provide overall planning, communication, and coordination for project development and implementation within their purview.

The following reviews State-Federal joint program activities by NMFS Regions:

The Northeast Region cooperated with all of the 19 northeast States comprising that Region. For the two State-Federal grant programs, 87 projects on research, development, enhancement, and services (costing about $4 million) are in progress, with 69 financed under Public Law 88-309 and the additional 18 projects funded under Public Law 89-304. Ongoing SFFMP efforts include:

1. Development of an FMP for northern shrimp off New England (implementation scheduled to begin soon). The program is tied to the priorities of the New England Fisheries Management Council and the adoption of that species into the FCMA management regime; and

2. Work on striped bass management, started with a successful workshop in September 1977 on biological, environmental, resource user, and sociopolitical aspects of management. This resulted in an endorsement for regional management of striped bass.

The Southeast Region, in cooperation with its 19 constituent States, is supporting 88 projects under two State-Federal grant programs--78 are funded under Public Law 88-309 and 10 under 89-304. Projects started in 1977 include:

1. Inventories of finfish and shellfish resources;

2. Surveys of the sport and commercial harvest of finfish and shellfish;

3. Impact of harvesting techniques and regulations on stream and reservoir commercial fisheries;

4. Techniques for production of river prawn, bighead carp, silver carp, and grass carp;

5. Development of new and improved oyster fishing grounds; and

6. Resource monitoring and management strategies development for anadromous fishes.

SFFMP activities in the Southeast included completion of fishery management plans for Gulf menhaden and Gulf shrimp. Committees also were organized to implement the plans. In addition, a mechanism was developed in the Gulf area to award future contracts for management plans through the Gulf States Marine Fisheries Commission.

The Southwest Region continued to coordinate its SFFMP with the California Department of Fish and Game. Renewed funding was provided for:

1. Independent Sportfish Sampling Project;

2. State-Federal Coordinator Project;

3. Assessment of the status of Southern California coastal stocks; and

4. Planning a revised SFFMP that will be directed toward management of fisheries that will not be candidates for plans prepared by the Regional Fishery Management Council.

The Northwest Region started four new projects on anadromous fishery investigations with the Washington Department of Fisheries. Ten new projects were started under Public Law 88-309--5 with inland States on freshwater commercial fisheries and 5 on marine fisheries and shellfishes.

Three anadromous fish projects were completed in 1977: operation of an Oregon salmon hatchery (funding was assumed by the State) and two salmon-tagging studies in Washington. Eight Public Law 88-309 projects were completed in all.

Ten Public Law 89-304 and 16 Public Law 88-309 projects are being continued, yielding needed information for management and providing operational support for production facilities. The projects range from studies on large inland reservoirs to research in the offshore marine environment. In addition, one SFFMP project on salmon was extended with the Pacific Marine Fisheries Commission.

The Alaska Region administered 6 Public Law 89-304 grants. Thirteen of the grants were awarded to the Alaska Department of Fish and Game and one to the Fisheries Research Institute, University of Washington. These grants were for fisheries management-oriented projects dealing with salmon and shellfish.

STATES MARINE FISHERIES COMMISSIONS

During 1977, the Interstate Marine Fisheries Commissions continued to work actively with their constituent States and with NMFS toward effective fishery management. The Atlantic States Marine Fisheries Commisson, the Pacific States Marine Fisheries Commission, and the Gulf States Marine Fisheries Commission played a particularly important role in meeting their responsibilities to support the Regional Fishery Management Councils. In addition, the Commissions continued to provide valuable coordination for the NMFS State-Federal Fisheries Management Program. Finally, the Commissions completed an extensive study of domestic fishery needs funded under the 1973 Eastland Resolution. A final report was published in 1977; it is being reviewed within NOAA/NMFS.

FISHERIES DEVELOPMENT

The U.S. 200-mile FCZ was created to conserve some major stocks which need protection from depletion. But, in addition to resources now exploited, there are substantial resources in the U.S. FCZ that are virtually unexploited. If these resources, plus those taken by foreign nations, were harvested by U.S. fleets, the domestic fishery catch, far from being static, could at least be doubled.

However, to harvest the resources that abound off the U.S. coasts, the following are needed: (1) improved technology to handle unconventional resources; (2) development of new and acceptable products; (3) better distribution and marketing; (4) improved extension services to help fishers; (5) training; and (6) substantial investments.

Fishery development activities include economic and marketing research and analyses for management and for use in developing our fishery resources, such as demand/supply projections, benefit/cost studies, and foreign trade evaluations; financial assistance in the form of loan guarantees and tax deferrals for construction or rehabilitation of vessels; microbiological, chemical, and technological research for improved use of the resource; voluntary fishery products inspection and certification; improvement of marketing practices and alleviation of short-term supply/demand imbalances; fishery educational services; coordination with industry to increase fish and shellfish supplies from domestic fishery resources.

To function effectively, fishery development activities must interrelate with other NMFS activities because they play an important role in determining fishery management and international fishery policies. Research,

development, and management are similar to three sides of a triangle: to exist and be fully effective, each requires the other two. When fishery development is successful, "resources" are turned into "seafood products." An unutilized or underutilized species is promoted to its fullest use consistent with conservation principles and consumer interests.

INDUSTRY AND CONSUMER SERVICES

These services help the Nation make efficient and expanded use of fishery products. Technical information on fishery supply and demand is provided to industry and the public. Support is provided for cooperative government/industry activities to analyze and remove barriers to fishery development.

Marketing

Regional marketing activities have been combined with regional fishery development programs. The need for national reactions continues to be met by coordinating NMFS and industry inputs. NMFS marketing efforts continue to be integrated with the media, retail food chain merchandisers, restaurant chain executives, and other appropriate food and consumer groups. As a result, consumers are informed as to the availability and advantages of using fishery products, and industry is increasing its production and contribution to the economy. Currently, marketing emphasis is on underutilized species.

o A study to determine cooked protein yield of fishery products was started. Research results will be used to update the U.S. Department of Agriculture National School Lunch Program recipes.

o A study has been contracted out to find out the domestic and export markets potential for fish and shellfish underutilized by the United States within the U.S. 200-mile FCZ. In addition, the study is to define financial, technological, and institutional barriers to domestic development of underutilized fisheries. The study is being conducted in calendar year 1978, and will include a national conference at which results will be presented to industry groups.

o The results of an Emergency Marketing Program conducted from November 1974 through April 1976 were evaluated and analyzed by Texas A & M University. The written report was received during 1977. The program was judged a success.

o NMFS continued to work closely with the Gulf and South Atlantic Fisheries Development Foundation in supporting State marketing efforts in Florida, North Carolina, and Texas that are consistent with fishery development objectives.

Current Market Analysis

Short-term market forecasts for major fishery products--food fish, shellfish, and industrial fishery products--were published at intervals of 4 months in Market Review and Outlook Reports. Important supplemental information was disseminated through timely releases in NMFS Fishery Market News Reports.

The NMFS monthly survey of retail prices for fish, meat, and poultry products in 10 cities was continued.

Since the establishment of the U.S. 200-mile FCZ, NMFS is responding to an increasing number of requests for a broad range of fishery market information.

Consumer Education

The NMFS National Fishery Education Center (NFEC) continued to produce and provide educational materials for consumers. Food editor materials were added to the NFEC photo-recipe library that serves the consumer education needs of industry, trade associations, extension personnel, and other users. Food photography assistance was provided to the Gulf and South Atlantic Fisheries Development Foundation.

o NFEC developed a four-part seafood retailing seminar in cooperation with NOAA's Office of Sea Grant and the Food Market Institute. This course covers the steps seafood merchandisers must take to assure high-quality and attractive products, proper sanitation, and effective product handling, display, and selling.

o NFEC designed a poster to educate the public on provisions of the Marine Mammal Protection Act of 1972.

Insurance

Technical assistance to help industry with fishing vessel insurance was continued.

o The transcript of proceedings of a May 1977 conference on commercial fishing vessel insurance and safety was published.

o A manual on mutual insurance associations for commercial fishing vessels that will help fishers understand the organization and operation of various alternative insurance systems was prepared and disseminated.

o Formation of a National Council of Fishing Vessel Safety and Insurance, as a nonprofit corporation, was cooperatively supported by NMFS, fishing and insurance industry representatives, and others who provide professional industry services.

Comprehensive Study of the
Molluscan Shellfish Industry

In 1977, the report "The Molluscan Shellfish Industries and Water Quality: Problems and Opportunities," was sent to the Congress as required by the Bauman Amendment to the Coastal Zone Management Act. This comprehensive review of the molluscan shellfish industry (oysters, clams, and mussels) includes an evaluation of the impact of Federal law on water quality. Major findings are that: shellfish-growing waters continue to be closed, mainly because of inadequate domestic waste treatment and urban runoff; the industry consists largely of small businesses, many family owned, and most without mechanization; and regulatory problems and lack of resources threaten the industry.

Contributing to the study were 22 shellfish-producing States, five Federal agencies, and major industry trade associations. The findings are serving as a foundation for developing cooperative government-industry actions to improve protection of shellfish waters and strengthen the industry.

Trade and Tariffs

o NMFS continued to cooperate with the Industry Sector Advisory Committee and the Office of International Trade Policy to support Multilateral Trade Negotiations in Geneva. Foreign tariff and nontariff measures affecting U.S. exports of fishery products were identified and material prepared for use in making U.S. requests to reduce these measures. Background information on fishery products dutiable in the Tariff Schedule of the United States was provided to the Office of International Trade Policy and positions developed for the negotiations. In addition, several fishery items proposed for the Generalized System of Preferences were reviewed and positions developed for use by the Special Representative for Trade.

Fishery Cooperatives

o A "List of Fishery Cooperatives in the United States, 1976" was published. This publication lists the cooperatives by State and includes in most instances the name of one of the officers, the number of members, the number of boats owned by members, the type of cooperative, and the major species of fish and shellfish caught.

o The publication, "Organizing and Operating Fishery Cooperatives in the United States" was revised and is to be published in early 1978.

SEAFOOD QUALITY AND INSPECTION

o During fiscal year 1977 (ended September 30, 1977), the amount of edible fishery products inspected was 601 million pounds--27 percent of all fishery products processed in the United States. A total of 94 plants was under contract inspection by December 1977--about 6 percent of all the processing facilities in the United States.

o The official inspection regulations that appear in the Code of Federal Regulations were reorganized to provide space for additional standards being prepared. The newly codified regulations were published September 30, 1977.

Figure 10.--Colored package labels used in a program by NMFS Northeast Fisheries Center's Gloucester Laboratory to guarantee the quality of fish fillets.

o Three government / industry cooperative consumer education projects were started during the year. NMFS cooperated with the McDonalds Restaurant chain and the Van Camp ("Chicken of the Sea" tuna) Seafood Company to assist them to

develop television spot announcements describing their use/marketing of USDC (U.S. Department of Commerce)-inspected products. The materials are to be used during Lent of 1978. The McIlhenny Company, which produces Tabasco sauce, in cooperation with NMFS, developed a 2- by 3-foot educational chart on 10 different USDC-inspected fishery products available to consumers. The chart is to be distributed by McIlhenny as well as the U.S. Department of Commerce.

o Final touches were put on the development of a multimedia teacher's unit on the nutritional attributes of seafood and the USDC inspection program. The unit contains three film strips, three tape cassettes, a teacher's guide, and student hand-out materials. Mass production and distribution of the materials is to be made in 1978.

o The inspection and certification of all fishery products bought by the U.S. military services was officially transferred to the U.S. Department of Commerce. Any plant wishing to sell fishery products to the armed forces must now come under USDC contract inspection. By the end of 1977, about 20 plants had applied for this type of inspection.

o The USDC Grade Standards for frozen fillets were revised to include fresh fillets.

o The second phase of the project to develop a new system for assigning market names to fishery products was completed. A model system has been developed and preliminarily tested. Final testing and evaluation of the "Nomenclature" project will occur in 1978.

o The States of Maine and Hawaii joined Tennessee, Oregon, and Arkansas by signing agreements which permit State inspectors to inspect and certify fishery products according to USDC requirements. These agreements provide a means to extend the availability of USDC inspection services without significant increases in Federal personnel.

DEVELOPING UNDERUTILIZED SPECIES

Fishery development activities have accelerated with the creation of the U.S. 200-mile FCZ. Many regional efforts are developing species that are not traditionally harvested by domestic fishers, but are often fished by foreign fleets. Cooperative industry/government efforts are directed to defining the resource; developing technologies in harvesting, handling, and processing; and developing domestic and foreign markets for new products. Efforts that typify this approach include the nonprofit New England Fisheries Development Program, the Pacific Tuna Development Foundation, and the South Atlantic and Gulf Fishery Development Foundations.

ECONOMIC ANALYSIS

During 1977, an economic analysis group was formed to (1) technically review fishery management plans, and determine economic impact analyses of regulations in the the plans and other NMFS fishery regulations; (2) analyze economic issues related to investment by the public and private sectors in development of U.S. fisheries, including benefit/cost analyses of specific development projects; (3) develop and maintain a system for forecasting prices and supplies of major fishery products in U.S. markets; and (4) provide analyses of economic issues related to consumption of fishery products.

FINANCIAL ASSISTANCE

Financial assistance is provided to industry under four authorities. The common purpose of the first three authorities is assisting the fishing industry to finance investments in commercial fishing vessels and gear. The fourth indemnifies against financial losses of U.S. vessels seized by foreign nations claiming ocean jurisdictions not recognized by the United States and provides assistance for loss, damage, or destruction of U.S. vessels and gear caused by any vessel of a foreign nation operating within the U.S. 200-mile FCZ.

The Fishing Vessel Obligation Guarantee (FVOG) program (46 U.S.C. 1271 et. seq.) is continuing to expand. A total of $26 million in guaranteed loans for the debt portion of fishing vessel construction and reconstruction costs was approved in 1977. This amount is projected to increase substantially in 1978. Guaranteed financings closed this year at an average maturity of 13.23 years and an average interest rate of 8.46 percent. It is estimated that the total of outstanding and approved guarantees will soon exceed the program's present guarantee authority allocation of $50 million. An increased allocation of guarantee authority has been requested. All administrative expenses of the program are paid by fees generated from program operations. Certain commercial passenger carrying fishing vessels were, by administrative action in 1977, made eligible to participate in this program. Legislation before Congress proposes to amend Title XI of the Merchant Marine Act, 1936, to allow guarantees for fishing vessels to equal 87-1/2 percent of actual project costs. Additionally, the maximum maturity (for certain vessels) of guaranteed loans was administratively increased from 15 to 20 years. This potential combination of 87-1/2 percent financing and 20-year maturities should make the FVOG program more responsive to the fishing industry's needs. (Legislation was passed on April 7, 1978; Public Law 95-257.)

The Fishing Vessel Capital Construction Fund (FVCCF) program (44 U.S.C. 1177 et. seq.), a tax-deferral program, continued to generate equity capital for vessel construction and refurbishing. Fishing vessel owners deposited $27 million of 1977 operational income into the FVCCF program. An estimated 160 vessels were constructed and 45 vessels reconstructed in 1977, with varying amounts of assistance from this program. In addition to regular commercial fishing vessels, certain commercial passenger carrying fishing vessels were, by administrative action in 1977, made eligible to participate in this program.

The Fisheries Loan Fund (FLF) program (16 U.S.C. 742c) continued under moratorium during 1977 while the potential for a direct loan fund to contribute to national fishery development was being considered.

The Fishermen's Guaranty Fund (FGF) program (22 U.S.C. 1971 et. seq.) during 1977 paid an additional $52,486 in delayed claims resulting from Ecuadorian seizures of seven U.S. tuna vessels in 1975. Agreements under the program included 126 vessels as of September 30, 1977. A legislative extension of this program's authoriztion (Public Law 95-194) includes low-interest loans to U.S. fishing vessel owners and operators for gear loss, damage, or destruction caused by any vessel of a foreign nation operating within the U.S. 200-mile FCZ. Procedures for administering this new phase of the program are being developed. Public Law 95-194 also extended until October 1, 1978, the portion (Section 7) of this program that idemnifies U.S. vessels (now primarily limited to high-seas tuna vessels) against the risks of fishing off foreign coasts.

MARINE RESOURCES MONITORING, ASSESSEMENT, AND PREDICTION PROGRAM

The National Marine Resources Monitoring, Assessment, and Prediction (MARMAP) program provides information for management of the Nation's marine fishery resources. It collects and analyzes data to obtain information on the abundance, composition, location, and condition of the commercial and recreational marine fishery resources of the United States. The resource assessment information is used to (1) establish management regimes and allocate resources between foreign and domestic fishers, and between domestic commercial and recreational fishers; (2) prepare fishery management plans as required by the FCMA; (3) support the United States in negotiating the management and allocation of fishery resources under international commissions and bilateral agreements; (4) aid in developing cooperative domestic State-Federal management plans; and (5) assist in environmental studies of the U.S. Outer Continental Shelf.

The principal elements of MARMAP include (1) resource surveys, (2) fishery oceanography, (3) fishery engineering, and (4) data analysis. Resource surveys assess the abundance and distribution of fish and shellfish in their egg, larval, juvenile, and adult stages. Fishery oceanography activities analyze the physical, chemical, and biological properties of the ocean that affect abundance and distribution of fish stocks; and predict impact of human activities and natural environmental processes on fishery productivity. Fishery survey technology continually develops new sampling techniques, including remote sensing from ships (hydroacoustics), and aircraft and satellites (electromagnetic). Engineering developments also serve to reduce waste of nontarget species taken during fishing for a single species and to devise means for conducting more rapid and cost-effective surveys. Data analysis assesses the condition of fishery resources based on information collected from commercial and recreational fishery and resource surveys. These analyses deal with the vital statistics of fish populations, and measure and predict annual changes in fishery stock abundance.

MARMAP activities were conducted during 1977 at strategically located NMFS Fisheries Centers and component laboratories (see fig. 7).

NORTHEAST:

o Resource assessment surveys were conducted of U.S. Continental Shelf waters from Nova Scotia to Cape Hatteras, North Carolina, with bottom trawls and dredges using the RVs Albatross IV and Delaware II.

o More extensive cooperative resource surveys and stock recruitment studies were made on cod, haddock, herring, yellowtail flounder, and other species on Georges Bank in cooperation with Canada, Federal Republic of Germany, German Democratic Republic, Poland, and U.S.S.R.

o Assistance was given in preparing Fishery Management Plans (Atlantic mackerel, Atlantic herring, red and silver hakes, other finfishes, and squid) based on analyses of data on growth rates, mortality rates, population abundance indices, and age composition of finfish and shellfish populations collected from resource surveys and fishery landings.

o Developmental work was continued on a hydroacoustic system for recording species, size, and abundance of fishes.

o Sharks, tunas, and billfishes were tagged in the Atlantic Ocean, Gulf of Mexico, and Mediterranean Sea to find out about their migration, feeding, growth, and reproduction.

o An underwater study was conducted of the Atlantic Submarine Canyon fishes with the deep-sea research submersible Alvin to study the Gulf

of Maine herring spawning grounds and Atlantic mackerel reproduction in the mid-Atlantic Bight.

o Studies were continued of the effects of environmental influences on the movements of adult fishes, and the growth and mortality of subadult fishes in the Gulf of Maine, Georges Bank, and the mid-Atlantic Bight ecosystems.

o Oceanographic conditions were assessed using NOAA satellite data and standard oceanographic methodology. Scientists monitored oceanographic conditions such as warm-core eddies, subsurface currents, and water temperatures. Relationships between temperature and growth of haddock and Atlantic cod were studied.

o Studies were made of the (1) relationship between growth and health of early life history stages of fishes and the ratio of ribonucleic acid to deoxyribonucleic acid in embryonic cells; and (2) cellular division and chromosomal abnormalities in embryonic fishes.

o The role of climate on fishery productivity was researched with emphasis on the influence of climate on sharks in the Long Island area, blue crabs in the Delmarva area, and groundfishes in the southern New England area.

o Relative abundance of larval fishes (Atlantic croaker, Atlantic herring, sand lance, Atlantic cod, haddock, pollock) was assessed for prediction of future changes in adult populations.

o Research was continued on the amounts and rates of flow of energy through the Georges Bank ecosystem.

o Improved surf clam and ocean quahog assessment equipment was developed, and effectiveness and efficiency of hydroacoustic assessment methods were evaluated using divers.

o A guide to the common tunas, billfishes, sharks, and other fishes caught by commercial longline fishers was prepared.

o Taxonomic projects included a revision of the classification of the blue hakes, catsharks, and American solenocerid shrimps; preparation of a synopsis and key to the ophidiiform fishes; description of a new genera of spider and xanthid crabs; revision of the classification of Spanish mackerels; and work on a guide to the temperate-water decapods off the U.S. East Coast.

o Analysis of data from expanded resource surveys was continued to improve data collection and analyses in cooperation with the States for development of better stock recruitment models and to provide analytical refinements of preliminary catch allowance determinations.

o A continuous oceanographic plankton recorder was developed in cooperation with the United Kingdom.

SOUTHEAST:

o Resource assessment surveys of U.S. Continental Shelf waters were conducted from Cape Hatteras to Florida under contract with the State of South Carolina (see fig. 11).

o Menhaden prerecruit survey was continued and sampling frequency was increased in cooperation with the State of North Carolina.

o Cooperative satellite assessment program between NOAA/NMFS/NASA/NFMOA/LANDSAT[1/] for menhaden and thread herring was completed.

o Cooperative program to develop tagging systems and techniques for tracking marine mammals and sea turtles was started.

o Program was started to use surface layer algorithms for determining pathway trajectories for fish eggs and larvae from offshore spawning areas to estuarine nursery grounds.

Figure 11.-NMFS scientists processing exploratory trawl fish samples on board RS Oregon II.

1/"NASA" = National Aeronautics and Space Administration; "NFMOA" = National Fish Meal and Oil Association; "LANDSAT" = land satellite.

o Commercial shrimp discards sampling was initiated to determine seasonal discard rates and species composition of the discards.

o A cooperative shrimp research program was continued with the State of Louisiana to determine growth, migration, and mortality of white and brown shrimp (see fig. 12).

Figure 12.-Experimental Shrimp tag used in mark-recapture studies.

o Population estimation models were developed using recruitment and mortality estimates for prediction of abundance of Atlantic and Gulf menhaden stocks.

Figure 13.-Scientific personnel inserting dart tag in tuna taken during exploratory survey.

o Resource assessment surveys were continued for scallops, and new scallop beds were located southeast of Charleston, South Carolina.

o Catch/effort estimates from recreational charter boats and headboats from Cape Hatteras to Florida were obtained. A maximum sustainable yield was formulated for the reef fishery of the South Atlantic Bight.

o Tagging and assessment programs on bluefin tuna and North Atlantic billfish stocks were continued (see fig. 13).

o An integrated Technical Information Service (TIMS) was established to meet the needs of Regional Fishery Management Councils for information on fish stocks.

o Plans were completed for a cooperative study with Mexico and the State of Texas for an assessment of transboundary shrimp stocks.

o A joint U.S./U.S.S.R. investigation of squid was conducted in the South Atlantic waters of the United States.

o Technical support and appropriate data were provided to Regional Fishery Management Councils for development of FMPs for billfishes and sharks, groundfishes, spiny lobster, reef fishes, Atlantic menhaden, and coastal pelagic fishes.

SOUTHWEST:

o Resource assessment surveys were conducted in cooperation with the State of California from Cape Mendocino to Baja California for anchovy, rockfishes, flounders, jack mackerel, tunas, and bonitos.

o Resource assessment surveys were conducted in cooperation with the State of Hawaii on insular fisheries.

o Technical support and appropriate data were provided to Regional Fishery Management Councils to develop FMPs for the seamount groundfish fishery, precious corals, and Pacific billfish and sharks.

o A major Fishery Information System planning project was started. This system will be used to provide support for carrying out responsibilities under FCMA.

o Tuna fishery data were compiled and analyses completed on the status of stocks of albacore, yellowfin, and bigeye tuna. These analyses were an important contribution to the annual appraisal of stock condition required by the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas.

NORTHWEST AND ALASKA:

o Resource assessment surveys were made in cooperation with the States of Washington and

Oregon for salmon, hake, shrimp, albacore, herring, halibut, and rockfishes.

o Resource assessment surveys were conducted in the Eastern Bering Sea in cooperation with the State of Alaska for pollock, king crab, snow crab, herring, and salmon.

o Resource assessment surveys were made in the Gulf of Alaska and Aleutians in cooperation with the State of Alaska for pollock, king crab, Pacific ocean perch, shrimp, and salmon.

o The operational phase of the cooperative Pacific Coast rockfish survey between Point Hueneme, California, and Cape Flattery, Washington, was finished.

o Formulation of a Dynamic Numerical Marine Ecosystem Model was completed to be used for analytical studies on the distribution of commercial fish, forcasting the effects of environmental anomalies and changing fishing intensity on marine resources, and for quantitative determination of possible effects of offshore oil developments on marine ecosystems.

o Fishery analysis activities were focused on preparing status-of-stock reports for each of the major fish stocks in the northeast Pacific and Bering Sea.

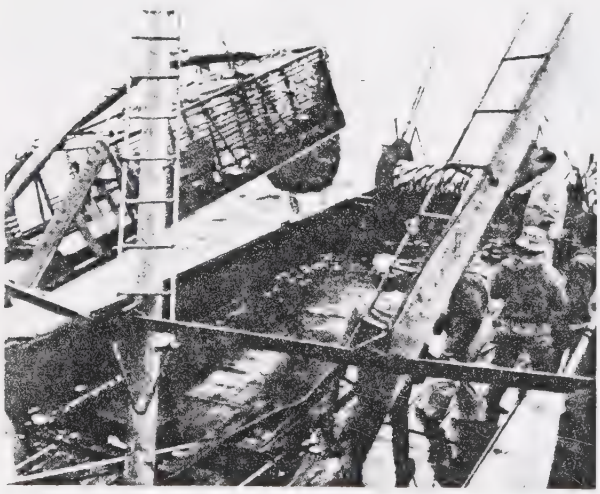

Figure 14.-Dredge catch being swung aboard the fishing vessel Smaragd during the 1977 joint industry/Federal/State of Alaska assessment of subtidal clams in the eastern Bering Sea.

o Assistance was given in developing scientific input for FMPs for Regional Fishery Management Councils.

o Fishing effort data, species composition, and average catch rates were compiled by using observers aboard foreign fishing vessels, which allowed estimates to be made of foreign catches and permitted projections of dates for reaching quotas.

o Commercially harvestable quantities of surf clams were located in subtidal waters of the Bering Sea. This was a cooperative industry-government joint venture and research effort (see figs. 14 and 15).

Figure 15.-Recording biological information about clams caught during the 1977 joint industry/Federal/State of Alaska assessment of subtidal clams in the eastern Bering Sea.

o Herring resource surveys were furnished that revealed the existence of three large, previously unknown herring winter aggregations in fjords on the west side of Baranof Island. These surveys resulted in the first complete acoustic biomass estimates of Lisianski Inlet herring. Results of these surveys were used by the State of Alaska in setting harvest levels.

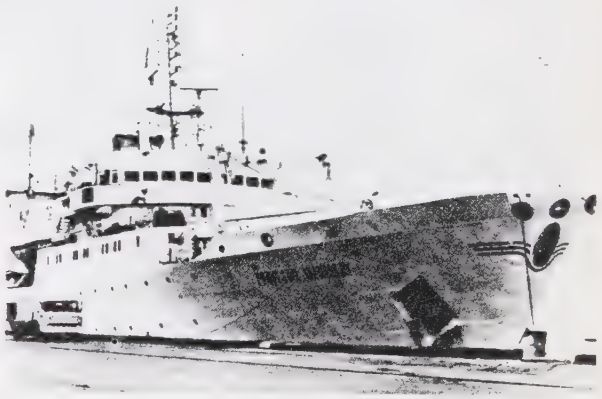

Figure 16.-Polish research vessel Profesor-Stedlecki, used in cooperative fishery investigations along the West Coast and in Gulf of Alaska, June-September 1977.

o An evaluation was made of a remote assessment device (RUFAS) for estimating the distribution and abundance of king and tanner crabs.

o The Southeast Alaska Troll Fishery Logbook Program was continued with excellent cooperation by vessel owners. Considerable new information on the food habits of salmon was obtained.

o A cooperative resource assessement program was conducted with the Sea Fisheries Research Institute of Gdynia, Poland (see fig. 16).

o Analyses of a joint sablefish tagging program involving the U.S.S.R. and the Republic of Korea was completed.

DATA MANAGEMENT, STATISTICS, AND MARKET NEWS

Additional data requirements were imposed on NMFS by FCMA. The first year under FCMA revealed more information on what these requirements are and how information should be managed for NMFS to efficiently carry out its responsibilities and provide the data needed by the Fishery Management Councils, the States, and others involved in managing the Nation's fisheries.

The major data elements missing were almost no data on recreational fisheries, and sporadic or incomplete economic and social data. These data are needed to develop FMPs as specified in FCMA.

o An intradepartmental committee on fishery management reviewed the economic and allied data needs and drafted a report of their findings. As a followup to that report, NMFS began developing plans to collect the needed data.

o PMPs and FMPs implemented during the year established quotas on domestic and foreign fisheries. To track these quotas requires collecting and compiling catch statistics in real-time to determine closure dates. The need for other information, such as tracking foreign fishing activities, foreign vessel permits, violations, and other operations also became apparent.

o NMFS laid the groundwork for a fishery information system in 1976, but found that a more concentrated effort was needed to meet its informational needs, especially in the central office in Washington, D.C. An Office of Information Systems was established to solve this problem.

Fishery statistical programs of NMFS include: (1) marine recreational fisheries, (2) commercial marine and inland fisheries, and (3) fishery market news.

The Marine Recreational Fisheries Statistics Program is planning to contract out a national survey of marine recreational fishing to begin September 1, 1978. This survey, the first in a series of planned annual surveys of the marine recreational fisheries, will obtain data on participation, catches of finfish, and catches of selected species of shellfish.

The survey design is based on an extensive methodology study completed in December 1977 for NMFS by contract with a private firm. The survey includes a combined telephone and onsite intercept (creel) survey--a random eight digit telephone survey to obtain participation and effort data and an intercept survey to obtain the distribution of the total catch at the species level. Results of the two surveys will be combined to produce various estimates of catch and participation. The telephone survey will be conducted at intervals of 2 months; the intercept survey will be continuous throughout the 12-month period. Interviews will be conducted with anglers fishing on party, charter, and private boats as well as those fishing from shore.

o Two FMPs, (1) Atlantic groundfish and (2) surf clams and ocean quahog, were promulgated in 1977. Quarterly commercial catch quotas for the domestic fisheries were established by the FMPs. Systems for collecting commercial catch and effort data and summarizing these data had to be streamlined to provide the timely information needed to monitor these quotas. Planning was begun to collect data on the commercial fisheries needed for FMP development and to provide data needed to monitor catches for additional fisheries as they came under management plans.

o Regulations for foreign fishing in the U.S. FCZ also require periodic catch reports to determine when foreign quotas will be attained. As a result, systems were set up for obtaining and compiling foreign catch statistics. Based on experience gained in 1977, changes were made in the 1978 regulations and the systems developed.

o NMFS continued to seek the cooperation of the States in collecting fishey statistics. A State/Federal fishery statistics system was developed with the North Carolina Department of Natural Resources and on December 2, 1977, a Memorandum of Understanding, outlining an agreement, was signed by both parties. This agreement, which went into effect January 2, 1978, enables the Southeast Fisheries Center and the North Carolina Department of Natural Resources and Community Development to better meet the demands for reliable fishery statistics to be used for fishery management decisions by North Carolina, NMFS, and the respective Regional Fishery Management Council. This agreement is the first of its kind between NMFS and a State fishery agency. NMFS will provide

survey management, design, and data processing and storage capabilities that are available through SEFC, and the North Carolina Department of Natural Resources will provide the additional field manpower required to collect raw data.

o Fishery Market News Reports are published three times a week at Boston (Massachusetts), New York (New York), New Orleans (Lousiana), Terminal Island (California), and Seattle (Washington). The reports show fishery landings, receipts at major markets, exvessel and wholesale prices, cold storage holdings, and other information of interest to fishing and allied industries. Originally, the reports were mailed free on request. However, since 1975, the reports are being sold by subscription. Early in 1977, paid subscriptions had dropped. As a result of a 1976 study, certain improvements in the contents of the reports were made. Among the changes, was publishing information on Regional Fishery Management Councils and their activities, Fishery Management Plans, and fishery regulations. These changes attracted a wider audience and by the end of the 1977 subscription sales were back to 1976 levels. Fishery Market News Reports are the only fishing industry source for timely information on fishery supplies, markets, prices, and other trends and developments.

INTERNATIONAL ASPECTS OF FISHERIES

International Fisheries staff of NMFS coordinates the Agency's participation in international activities concerning living marine resources of interest to the United States. In conjunction with the Department of State, the staff conducts negotiations with various foreign governments on fishery matters of concern to the United States.

NMFS also coordinates a Regional Fisheries Attache Program with U.S. Embassies in Casablanca, Copenhagen, Mexico City, and Tokyo so as to follow major developments in world fisheries and determine their impact on U.S. Government policies and programs as well as the U.S. fishing industry.

The United States is party to seven international fishery commissions; NMFS provides support for the U.S. Commissioners.

In addition, the international fisheries staff provides support for bilateral fishery claims boards and operates a translation program for NOAA areas of responsibility.

INTERNATIONAL NEGOTIATIONS

During 1977, efforts were focused on restructuring U.S. fishery relations with other nations in accordance with the Fishery Conservation and Management Act of 1976 (FCMA). Six additional Governing International Fishery Agreements (GIFAs) were concluded in 1977, and efforts continued in renegotiating several international fishery conventions. U.S. negotiators in 1977 also sought to (1) assure U.S. fishers continued access to stocks traditionally fished off the coasts of other countries; (2) advocate international measures for protection and conservation of marine mammals and highly migratory fish species; and (3) resolve certain maritime boundary and resource jurisdiction issues stemming from newly established fishery conservation zones in the Western Hemisphere. Implementation of U.S. management authority over stocks within the U.S. FCZ in addition requires interaction between officials of the United States and other governments.

Enactment of FCMA extending fishery jurisdiction of the United States established important new responsibilities and directions in international negotiations. FCMA provides for the negotiation of governing international fishery agreements under which those nations desiring to be eligible for opportunities to fish for resources under the exclusive fishery management authority of the United States shall acknowledge such exclusive U.S. fishery management authority as set forth in the Act. FCMA also calls for the Secretary of State, in cooperation with the Secretary of Commerce, to (1) renegotiate any fishing treaty for resources subject to the exclusive fishery management authority of the United States, if such renegotiation is necessary to conform such treaties to the purposes, policies, and provisions of FCMA; (2) negotiate new international fishery agreements: "(a) which allow fishing vessels of the United States equitable access to fisheries over which foreign nations assert exclusive fishery management authority, and (b) which provide for the conservation and management of anadromous and highly migratory species;" and (3) negotiate the boundaries of the U.S. FCZ in relation to other nations.

Governing International Fishery Agreements (GIFAs)

o The United States concluded GIFAs in 1977 with Cuba, European Economic Community, Japan, Mexico, Republic of Korea, and Spain. These additional GIFAs bring the number of such agreements negotiated pursuant to provisions of FCMA to 12. Previous GIFAs include those negotiated with Bulgaria, German Democratic Republic, Poland, Republic of China (Taiwan), Romania, and U.S.S.R.

International Convention for the Northwest Atlantic Fisheries

The United States withdrew from the International Convention for the Northwest Atlantic Fisheries (ICNAF) on December 31,1976. In 1977, the Canadian Government scheduled two

preparatory meetings followed by a Diplomatic Conference to consider alternatives for future multilateral cooperation in Northwest Atlantic fisheries. Although there was no final agreement, substantial progress was made on most substantive items. The draft convention considered during the Diplomatic Conference in October would establish a Northwest Atlantic Fisheries Organization (NAFO) that would be responsible for continuing multilateral scientific research and investigation of Northwest Atlantic fish stocks and for managing and allocating catches of stocks that occur beyond national fishery limits. In the case of overlapping stocks, the Organization would ensure consistency between management measures taken beyond national fishery limits by the Contracting Parties and those taken within such limits by the appropriate coastal state.

International Convention for the High Seas Fisheries of the North Pacific Ocean

Canada, Japan, and United States established the International North Pacific Fishery Commission in 1952 to provide protection to salmon of North American origin and to exchange scientific information concerning such salmon species. On February 10, 1977, the United States announced its intent to withdrew in 1 year from the International Convention for the High Seas Fisheries of the North Pacific Ocean, the convention establishing the Commission. In October 1977, the Contracting Parties began negotiations for a new convention. Through such a convention the United States seeks protection for salmon of North American origin in the Pacific, and appropriate scientific exchanges. Negotiations were scheduled to resume early in 1978 toward these goals.

Convention for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea

In accordance with FCMA provisions, the United States announced on April 1, 1977, its intention to terminate in 2 years this convention wich has provided for joint management by the United States and Canada of the North Pacific and Bering Sea halibut fisheries. The U.S.-Canada reciprocal fisheries agreement, applicable in 1977, permits halibut fishing by both countries to continue off the coast of the other under Convention regulations. The two countries are considering future access to halibut stocks within the context of broader ongoing negotiations concerning maritime boundaries and fishery resources.

Convention for the Establishment of an Inter-American Tropical Tuna Commission

Since 1949 the Inter-American Tropical Tuna Commission (IATTC) has managed tuna resources in the eastern tropical Pacific. However, the interest of various coastal States in increased shares of the catch resulted in September 1977 in an intergovernmental meeting called by Mexico and Costa Rica to consider the future of IATTC. The United States advocated continuation of the Convention at the meeting but, following formal announcements by Mexico and Costa Rica of their intentions to withdraw from IATTC, Mexico deposited a formal instrument of withdrawal on November 8, 1977, effective 1 year from that date. The Commission agreed to meet early in 1978 to consider future arrangements.

The Commission made progress in 1977 toward reducing the incidental take of porpoise during commercial fishing operations for tuna. As a result of U.S. initiatives, the Commission agreed to undertake research to evaluate the status of the porpoise populations in the eastern tropical Pacific and to implement programs designed to reduce the incidental mortality of porpoise by vessels involved in the tuna fishery in the eastern tropical Pacific. The program of porpoise research authorized by the Commission will focus primarily on (1) the recruitment and training of scientific technicians who will collect data from vessels at sea on the stocks of porpoise in the eastern Pacific and (2) workshops to evaluate and disseminate porpoise-saving techniques and gear technology.

Antarctic Negotiations Concerning a New Treaty for Living Marine Resources

Work accelerated in 1977 on a new treaty regarding conservation measures and rational management for all Antarctic living marine resources. The Ninth Meeting of the Antarctic Treaty Consultative Parties in September and October resulted in the recommendation that a definitive regime for the conservation of Antarctic living marine resources be concluded before the end of 1978. The new regime would not apply to species such as whales and seals, already regulated by existing international agreements, but would take into account the relationship of such species to the whole of the Antarctic ecosystem. Major resources to be included in the treaty are krill (a small, shrimp-like crustaecean found in abundance), fish, and marine birds. The area of specific competence of the Antarctic Treaty will apply to the new regime, but it could be extended north of 60° south latitude where necessary for effective conservation of the species covered.

Thirteen countries are currently parties to the Antarctic Treaty, and they will negotiate the new regime, with the possible participation of other interested states or international organizations. The thirteen are: Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Poland, Republic of South Africa, United Kingdom, United States, and U.S.S.R.

A special consultative meeting is to be held in February and March 1978 to elaborate details of a new treaty, to be followed by conclusive negotiations later in the year.

U.S.-Canada Maritime Boundary
Fisheries Resources Negotiation

As a result of broader jurisdiction over fisheries, the United States and Canada began efforts at restructuring existing bilateral fisheries agreements between the two countries and at defining maritime boundaries between them. As an interim step, on February 24, 1977, the two countries signed a reciprocal fisheries agreement for 1977 to permit continued fishing by one country off the coast of the other during 1977.

To deal with the issues for the longer term, the two governments appointed chief negotiators on August 1, 1977, to conduct a single negotiation addressing boundary questions and all fishery issues of joint concern other than Pacific salmon interception questions (which are the subject of a separate negotiation).

On October 14, 1977, the chief negotiators, Ambassadors Cutler and Cadieux, submitted draft principles of a comprehensive settlement concerning maritime boundaries and related resource issues to their respective governments. Among other things, the principles call for the establishment of a joint fishery commission for the cooperative management of fish stocks of common concern. The two governments approved the proposed principles as a basis for trying to negotiate a comprehensive agreement. Toward this end, a series of meetings was initiated in the latter part of 1977 and was scheduled to continue in early 1978.

The United States and Canada also continued negotiations in 1977 on a new agreement for the conduct and conservation of Pacific salmon fisheries off both countries, with particular emphasis on the problem of interceptions by nationals of one country of salmon bound for spawning in the rivers of the other country.

Distant-Water Fisheries

In negotiations with Brazil in February 1977, the United States successfully developed arrangements that allowed U.S. shrimp fishing to continue in defined waters off the coast of Brazil until December 31, 1977. The agreement was the third in a series of cooperative arrangements concluded by the United States and Brazil for the conservation of shrimp resources off Brazil. With enactment of FCMA, U.S. objectives in the discussions with Brazil focused on substantially modifying the role in the U.S. Government as it relates to the procedures implementing the agreement. Thus, the 1977 agreement, unlike the two previous agreements, no longer provides for the direct involvement by the U.S. Government in the administrative mechanisms and contains no financial commitment to the Government of Brazil.

o Following implementation by the European Economic Community on January 1, 1977, of a 200-mile zone off French Guiana, the United States secured interim access without permit fees to French Guianan waters for a number of U.S. shrimp vessels for 1977 through licensing arrangements; 120 vessels were allowed access prior to September 30, and 85 thereafter.

International Commission for
the Conservation of Atlantic Tunas

FCMA does not extend exclusive U.S. management authority to highly migratory species of tuna that during their life cycle spawn and migrate over great distances of the oceans. Instead, taking into account the need for international cooperation in managing such species, the United States participates in international conservation agreements. In 1977, the International Commission for the Conservation of Atlantic Tunas (ICCAT) agreed to extend for an additional 2 years until August 10, 1980, the existing ICCAT recommendation limiting fishing mortality of Atlantic bluefin tuna to recent levels.

International Whaling Commission

The 29th Meeting of the International Whaling Commission (IWC) in June and the IWC Special Meeting in December 1977 established catch limits that again were reduced from the previous year. The reduction from the 1976/77 to 1977/78 season is 16 percent; the reduction from the 1973/74 to 1977/78 season is about 50 percent. The Scientific Committee of the IWC paid particular attention to analyses of the Southern Hemisphere sei whales in April and June and to North Pacific sperm whales in November 1977. Although catch limits of both species show reductions from the previous year, the 1978 quota for North Pacific sperm whales was first established in June at 763 females and no males. The Scientific Committee met subsequently to analyze more fully the data on North Pacific sperm whales. Special meetings of the Committee and the Commission resulted in a revised 1978 catch limit on sperm whales of 6,444 in accordance with the recommendation of the Scientific Committee.

For the first time, IWC in 1977 set regulations on the take of bowhead whales by Alaska Eskimos. The United States requested that the Commission, at its Special Meeting in December, reconsider its June position that Alaska Eskimos should not take bowhead whales. At its Special Meeting, the Commission agreed to allow Alaska Eskimos to kill 12 or strike 18 bowhead whales, whichever comes first.

North Pacific Fur Seal Commission

The North Pacific Fur Seal Commission held its 20th Annual Meeting in March 1977. The prohibition of pelagic sealing for commercial purposes remained unchanged. The total harvest of fur seals in 1976 was 5,200 by the Soviet Union (2,500 on Robben Island and 2,700 on the Commander Islands), and 23,081 by the United States on St. Paul Island. (The U.S. harvest is shared with Canada and Japan.)

International Fisheries Claims Boards

The U.S.-U.S.S.R. Claims Board considered eight claims during the year which included five claims remaining under active consideration at the close of 1976, two claims filed in 1977, and one claim considered with the Board sitting in arbitration. Recommendations favorable to the claimants were made in four claims in the amount of $21,400. Four claims remain under active consideration by the Board and one claim that was found to be deficient in 1976 was reinstated after the claimant took steps necessary to complete the record. The claim submitted to arbitration after the claimant refused the recommended settlement was deferred at the request of the claimant so that additional materials might be submitted for the record.

The U.S.-Polish Claims Board met once during 1977 to deal with procedural matters. No new claims were filed during the year, and there were none outstanding from prior years.

ANALYSIS OF TRENDS IN WORLD FISHERIES

The analysis of political and economic trends in world fisheries has always been an important NMFS activity, but is becoming more so because of the extension of U.S. fishery jurisdiction. Extensive analyses of foreign fisheries are required for negotiations with foreign countries and to regulate foreign fishing in the U.S. 200-mile FCZ. In addition, foreign developments must be studied to determine their possible impact on the U.S. fishing industry and U.S. Government policies and programs.

o Current information on major developments in world fisheries was collected and evaluated. NMFS received and used data prepared by over 160 U.S. diplomatic posts and four Regional Fishery Attaches. More than 5,700 cables, dealing with fisheries and related subjects, were received, processed, and analyzed during 1977. This was 37 percent more than in 1976. In addition, foreign fishery ministries and agencies exchanged over 700 publications, many in foreign languages, with NMFS International Fisheries staff.

o Developments in world fisheries are followed closely when they could or do affect the fortunes of the U.S. domestic industry or the policies of the U.S. Government. A total of 271 reports on international fisheries describing economic, marketing, technological, and political trends was prepared.

o The file, established in 1976, of foreign and U.S. companies interested in joint ventures was expanded in 1977.

o Detailed surveys on the fisheries of Angola, Japan, Republic of South Africa, Uruguay, and U.S.S.R. were published and disseminated.

o Fishery reporting requirements of the Department of State were revised and appraisals prepared of cables received from U.S. diplomatic posts. Briefings were arranged for about 50 Foreign Service Officers going to new assignments.

FOREIGN MARKETING SERVICES

A number of marketing services were provided to the U.S. fishing industry. Priority was given to actions assisting U.S. companies to take advantage of the opportunities created by the new U.S. 200-mile FCZ and the extended fishery jurisdictions of other countries. The U.S. fishing industry hopes to harvest the underutilized species of fish and shellfish in U.S. waters; also, that continued, comprehensive, and thorough analyses of world trends will highlight opportunities for U.S. fishery investments abroad, and expanded or new markets for U.S. fishery products, vessels, gear, and processing equipment.

o Current fishery export opportunities were disseminated to U.S. exporters. In addition, lists are maintained by species and country of foreign companies that import fishery commodities.

o Detailed files are maintained on foreign fishery markets and fishing industries. The information was used to prepare almost 600 letters that were sent to U.S. companies requesting specific marketing assistance. An even greater number of telephone queries was processed. In addition, the information in these files is available for the use of Federal and State government agencies, industry, and the academic community.

o A comprehensive study of 20 Latin American countries (detailing fishery agencies, trade journals, fishery trade associations, fishing companies, commercial representatives, seafood detentions, and available foreign fishery reports) was prepared and disseminated to the U.S. fishing industry.

o Specific fishery marketing information was provided to interested companies. Information on foreign investment opportunities was disseminated to U.S. companies that have stated

an interest in forming overseas joint ventures with foreign companies. U.S. shipyards, manufacturers of gear and equipment, and consultants have been informed of foreign fishery development programs and other opportunities that may result in export sales. U.S. companies involved with aquaculture have been informed of overseas sales and investment opportunities.

o Detentions of seafood imports by the U.S. Customs Service were studied, and a comprehensive report allowed U.S. importers to evaluate the quality control of foreign companies.

o Detailed marketing studies were conducted on specific countries and fisheries of major interest to the U.S. fishing industry. The analyses of the Latin American spiny lobster fisheries, begun in 1976, was continued in 1977. The spiny lobster fisheries in Belize, Bermuda, Columbia, Dominican Republic, El Salvador, Jamaica, Nicaragua, Panama, Puerto Rico, Trinidad-Tobago, and Venezuela were described in considerable detail. The research on Brazilian and Cuban lobster fisheries was completed and will be published in early 1978. This series of indepth studies was designed to help U.S. companies obtain adequate supplies of this commodity whose normal trade patterns were disrupted by the withdrawal of U.S. fishers from the spiny lobster fisheries off the Bahamas. The study also highlights the opportunities for U.S. entry into these fisheries and the export potential for U.S. shipyards and manufacturers of gear and processing equipment.

o Studies were prepared on the markets for several fishery products in European countries, including reports on trends in the Icelandic groundfish industry, Norwegian cod production, and the herring market in the Federal Republic of Germany. Developments in Canada received considerable attention, especially trends in fishery landings, development plans, and subsidy programs, because these are of interest to U.S. industry.

o Lists of European and African fishery agencies by country were prepared. Data for a similar list for Latin America was collected and will be published in 1978.

o Market survey reports, prepared for U.S. fishery trade journals, covered fishery developments in India, Japan, Mexico, Republic of Korea, and U.S.S.R.; briefer reports dealt with many other countries.

TRANSLATION SERVICE

NMFS serves as a national clearinghouse for translated foreign fisheries, oceanographic, and atmospheric literature. It determines the need and priorities of pertinent literature in these fields, initiates its search, and arranges for its translation. The translated literature is disseminated to potential users.

In addition, NMFS determines the significance of and the need for foreign current events information in these fields, and translates, summarizes, and distributes this information.

NMFS serves the National Advisory Committee on Oceans and Atmosphere (NACOA) by arranging for translation of needed literature in the field of aquaculture.

o Translations are produced inhouse, by contract, or overseas using the Public Law 83-480 Special Foreign Currencies. Four releases are published monthly (or weekly) to inform users of new foreign literature and current translations. These are: (1) "Received or Planned Current Foreign Fisheries, Oceanographic, and Atmospheric Translations"; (2) "Translated Table of Contents of Current Foreign Fisheries, Oceanographic, and Atmospheric Publications"; (3) Survey of Foreign Fisheries, Oceanographic, and Atmospheric Literature"; and (4) the "Daily News" releases. Extensive exchanges of translations and publications are maintained with many leading national and foreign institutions and organizations. A large number of translations were distributed during 1977 to government, industry, international organizations, and academic circles. Notable translations produced in 1977 included: "Aquaculture in Shallow Seas," by Takeo Imai; "Handbook of Hydrological Studies in Oceans and Seas," by I. M. Soskin; and "Forecasting of Hail, Thunderstorms and Showers," by G. K. Sulakvelidze, et al.

MARINE RECREATIONAL FISHERIES

NMFS' Marine Recreational Fisheries staff works with Scientific and Technical Services personnel to provide program direction, prepare program plans, direct and monitor research activities on recreationally important species, interface with recreational constituency groups, and provide advice and guidance on marine recreational fishery activities.

Research on species important to marine recreational fishers carried out at all four NMFS Fisheries Centers (see fig. 7) is coordinated through the Regional and Washington Offices.

NORTHEAST REGION

Personnel of the Northeast Fisheries Center (Sandy Hook Laboratory) continued to census the recreational and party boat fishery in Maryland, New Jersey, and New York. Information on catches, amount of effort expended, and age, weight, and lengths of fishes landed is used in

the preparation of stock assessments.

o NMFS' cooperative shark-tagging program, conducted out of the Narragansett Laboratory, in 1977 tagged and released 3,743 sharks, tunas, and billfishes of 35 species. During the same period, 136 tags were recovered from 15 species of sharks and a broadbill swordfish. The maximum time at liberty was for a sandbar shark that was recaptured 12 years after it was tagged. The maximum distance traveled was 1,900 miles by a swordfish, which also shows migrations of this species from the Gulf of Mexico into the Atlantic.

For 15 years, biologists have monitored the catches of sharks off Long Island using catch data from the Annual Bay Shore Mako Tournament. In June 1977, participants in this model tournament were asked to tag and release part of their catch. This experiment was designed to confirm the hypothesis that shark populations off Long Island move north and east during the summer. A total of 150 sportfishing crews tagged 323 sharks of which 9 have been recovered. (Results are summarized in an ICES paper, C.M. 1977:H:42. A paper on Reproduction in the blue shark was also submitted for publication.)

The tagging program, involving over 2,000 cooperating fishers, is but one part of ongoing studies of oceanic gamefish that includes work on age and growth, trophodynamics, and reproduction. Three longline cruises were conducted off the Northeast coast to sample apex predators. A total of 652 sharks and other fish were caught, tagged, and released, or brought on board for examination. The highlight of one cruise was the sonic tagging of a swordfish in cooperation with Dr. Carey of the Woods Hole Oceanographic Institution. The swordfish was followed continuously for three days and exhibited well-defined diurnal swimming behavior with respect to depth.

o Two mako sharks in excess of 1,000 pounds were landed at Montauk, New York, in July 1977. The larger, a 1,250-pound female, contained 80 pounds of swordfish remains. As far as we know, these are the largest makos taken in the Atlantic.

NORTHWEST REGION

o The Northwest Center has been tagging rockfish (Sebastes spp.) in Puget Sound since 1976, and there were 20 recoveries during 1977 as compared with 14 in 1976. Most of the 1977 returns were from the 454 fish tagged in 1976. In 1977, a total of 145 fish was tagged. The work is an important part of efforts to chart the distribution, abundance, and availability to recreational fishers of nonsalmonid species in Puget Sound that have high recreational potential.

SOUTHWEST REGION

The Southwest Region continued funding, through its State-Federal Program, for California Department of Fish and Game creel surveys at launching ramps, hoists, marinas, and other sites. These surveys provide data on catch, effort, species composition, and length frequency of fishes caught by southern California recreational fishers. The data are proving to be useful for stock assessment and evaluation of the effectiveness of current recreational fishery management measures.

Recreational fishery research is the focus for a number of major programs at the Southwest Fisheries Center (SWFC), providing significant information for the formulation of positions and plans for managing these resources.

o At SWFC's La Jolla Laboratory, the cooperative marine game fish tagging continues with over 1,100 billfish tagged and released in 1977. In a cooperative arrangement between SWFC and the New South Wales Fisheries Agency, U.S. and Australian anglers caught, tagged, and released an estimated 630 black marlin in the Coral Sea off the northeast coast of Australia. In 1977, about 60 percent of the black marlin released off Australia were tagged with Australian tags. There is also a cooperative arrangement with the New Zealand Ministry of Fisheries and Agriculture for tagging billfish and other species. Although the number of tagged and released billfish was down in 1977, a notable increase did occur in the tagging of blue marlin around the Hawaiian Islands.

o The 8th annual Pacific Billfish Angler Survey was conducted in cooperation with the International Gamefish Association. In 1976, anglers reported fishing over 8,500 days and catching 3,119 billfish for an overall catch rate of 0.36 billfish per day or 2.7 days per billfish.

o A joint effort of the SWFC's Tiburon and La Jolla Laboratories, the 139-page Anglers Guide to the United States, Pacific Coast, will be released for public sale in early 1978. The guide includes a review of the major marine game species, fishing grounds (40 charts), and facilities in coastal areas from Mexico to Canada, Alaska, Hawaiian Islands, American Samoa, and Guam.

o Marine recreational fisheries research at SWFC took a new tack with efforts to measure the economic importance of commercial partyboat fisheries. In 1977, contracts were awarded to two firms for an economic profile of California commercial partyboat passengers and an economic analysis of the California live-bait and commercial partyboat fisheries.

o Early in 1977, a project was started by the Honolulu Laboratory in cooperation with the Pacific Tuna Development Foundation to determine the efficacy of floating objects to aggregate and hold fish schools. Several test devices were anchored within 30 miles of Honolulu in depths from 250 to 500 fathoms. Each device consists of a large buoy made of two 55-gallon drums from which a piece of large-meshed netting is suspended. The devices have had marked success in attracting a variety of sport fishes as indicated by enthusiastic reports from recreational fishers. Recreational fishers from other parts of the Hawaiian Islands have asked to have similar aggregation devices installed in their areas.

In December 1977, the Honolulu Laboratory hosted an international billfish stock assessment workshop. This was the first indepth analysis to determine the status of billfish stocks on an ocean-wide basis. The results of the workshop, in terms of new knowledge of these large gamefishes, should be of benefit to the recreational fisheries as well as to the commercial fishing industry. The Pacific blue marlin resource was found to be overfished, the stocks of striped marlin and swordfish were reported to be in reasonably good condition, and accurate assessments could not be made for the black marlin, sailfish, and shortbill spearfish for lack of data.

At SWFC's Tiburon Laboratory, almost all efforts and funds are directed into recreational fishery research. Examples of such work include studies on the important problem of mortality in early life stages of striped bass, a major recreational fish of the San Francisco area. It was found that striped bass larvae have one of the highest endogenous sources of energy of any teleost studied so far. The energy is utilized by feeding larvae in various ways, depending on the amount of external food sources available. In laboratory experiments, it was found that the amount of food required for metabolism was greater than had been previously determined by other investigators. This information on stripers is important because of the potential effects various water management techniques in the San Francisco Bay-Delta area might have on critical stages of the striper's life.

o The year 1977 marked the fourth year of the salmon pen-rearing program at the Tiburon Laboratory. The goal is to test the feasibility of pen-rearing salmon in saltwater for later release into San Franciso Bay to improve recreational salmon fishing in the Bay area. About 13,000 pen-rearing silver salmon were released in 1977.

o Analysis of data on nearshore recreational fish communities in southern California continued. The research in this project deals primarily with the interactions that occur between important recreational fishes in nearshore communities. Major species groups, which are all studied in their natural habitats, include rockfishes, surfperches, sea basses, greenlings, and flatfishes.

SOUTHEAST REGION

The last NMFS reorganization extended the Southeast Fisheries Centers' recreational research responsibilities from Cape Hatteras south around the Florida Keys all the way west to the Mexican border. This represents about half of the fishable coastline in the continental United States and provides year-round opportunities to anglers. One example of these opportunities is the new night recreational fishery for swordfish that is rapidly developing off the southeast coast of Florida. Because of the potential of this fishery, a workshop was held in Miami in June to review all available information on the biology, ecology, population dynamics, and post-fishing effort to identify potential management problems. The information is now available for use by the Fishery Management Councils and the State agencies.

o A total of 2,078 bluefin tuna were tagged and released off the East Coast in 1977, of which 201 were fish larger than 300 pounds. This brings the total number of bluefin tagged in recent years to over 18,000. Recaptures in 1977 totaled 124 of which 20 were giants. This tagging is a cooperative venture with anglers, commercial fishers, and the Woods Hole Oceanographic Institution.

SPECIALIZED PROGRAMS

AQUACULTURE

The primary NMFS goal for fisheries is to maintain or increase the availability of a broad spectrum of marine aquatic resources and products for the U.S. consumer. For aquaculture the goal is to have public hatcheries or private husbandry increase production of selected species that are in short supply.

Aquacultural research at NMFS laboratories addresses biological and technological impediments to commercial development and/or augmenting natural stocks by public agencies. Specific areas of research include genetics, pathology, nutrition, culture system technology, reproduction and spawning, and environmental and physiological requirements.

Northeast Fisheries Center (NEFC)

MILFORD LABORATORY

o Studies determined food and space requirements of juvenile bay scallops and surf clams,

and the smallest size at which these mollusks could be transplanted from hatcheries to outdoor pumped raceways. Surf clams spawned in November 1976 grew to marketable size in 8 months.

Figure 17.-Juvenile oysters (attached to strings of scallop shells) reared at NMFS Northeast Fisheries Center's Milford Laboratory for an aquaculture breeding experiment.

o Research showed that selectively breeding American oysters will produce faster growing strains. Other genetics and breeding studies on oysters have dealt with inbreeding to create a line of animals for hybridization, determination of potential adverse effects of inbreeding, and performance appraisals of interspecific and intraspecific hybrids. (See fig. 17.)

o The Laboratory provided pure cultures of unicellular algae as food for larval and juvenile mollusks used in research and pilot hatchery operations. (A paper on this work and other aspects of food production in molluscan aquaculture was presented at a Mariculture Working Group Meeting of the International Council for the Exploration of the Sea[2/]). Other efforts in the molluscan food production field were development of a cheaper algal growth medium for use in commercial hatcheries, and application of epifluorescence to measure food uptake and digestion on larval oysters.

OXFORD LABORATORY

o Two bacteria in oyster hatcheries that are lethal to American oyster larvae were identified. These bacteria do not need to be present in the larval culture vessels themselves; the toxins alone need only be present in the hatchery's water system.

o Disease control in molluscan aquaculture was studied to determine the ozone dose and seawater flow rate needed to detoxify clams of paralytic shellfish poisoning.

Southeast Fisheries Center (SEFC)

GALVESTON LABORATORY

o Intensive culture was continued to develop the principles and techniques for rearing marine animals in culture systems where environmental control is exercised. Bait shrimp held in a closed raceway system at stocking densities of 25 and 50/ft^2 demonstrated excellent growth at these extremely high densities.

o A cooperative program was established with the State of Texas to mature, hatch, and rear redfish. Presently, redfish are being reared to a size suitable for tagging and releasing into Texas estuaries to enhance recreational and commercial catches.

o A cooperative program was initiated with the National Park Service, the U.S. Fish and Wildlife Service, the State of Texas, and the Instituto National de Pesca de Mexico to enhance endangered populations of the Atlantic Ridley turtle. The Galveston Laboratory will have the responsibility for rearing hatchling Atlantic Ridley turtles as part of a headstart program.

o Previous rearing studies on loggerhead turtle hatchlings have provided an excellent opportunity to transfer technology to the rearing of Atlantic Ridley turtles. A format has been developed for diagnosis and treatment of a variety of diseases that represent a major constraint to the turtle rearing-program. A new turtle holding facility is being designed to hold turtles during the colder winter months and to minimize the incidence of disease.

COLLEGE PARK LABORATORY

o Research at College Park is addressing the nutritional requirements of the freshwater prawn Macrobrachium. The program is part of a cooperative research agreement with the South Carolina Marine Resources Research Institute (MRRI).

[2/]Ukeles, R. 1977. Culture of algae for feeding larval and juvenile mollusks in controlled aquaculture. Actes de colloques du C.N.E.X.O. 4:361-370 (in press).

o A comprehensive program for Macrobrachium nutritional research was prepared jointly by NMFS and MRRI. Industry critiques are supportive of the priorities and direction of this plan.

o A paper reviewing the state-of-the-art relative to available information on nutrient needs of cultured Macrobrachium was published.[3/]

o The College Park Laboratory is scheduled for relocation by mid-1978 to Charleston, South Carolina.

Northwest and Alaska Fisheries Center (NWAFC)

MANCHESTER LABORATORY

o A pilot study was begun to determine, through a series of sequential tests, the status of smoltification and adaptability to ocean survival of Pacific salmon released from Columbia River hatcheries--releases that now contribute $33 million annually to Pacific coast recreational and commercial fisheries. These tests involved monitoring the levels of sodium and potassium salts of an active enzyme--adenosine triphosphate (ATPase)--in the gills of juvenile salmon as a "smoltification" indicator (see fig. 18). The objective of the study is to develop an effective biochemical indicator to determine the most productive time for releasing juvenile salmonids from hatcheries to improve adult returns at NMFS-funded hatcheries in the Columbia River.

SEATTLE LABORATORY

o Research continued on fish nutrition which included evaluation of alternative protein sources to replace fish meal in salmonid diets. Long-term feeding tests have shown that significantly less growth, less efficient feed conversion, and, in some cases, physiological indications of nutritional deficiency are apparent at high levels of substitution with some plant proteins.

o Cooperative industry studies showed the desirable effects of adding carotenoid pigments derived from natural sources (pelagic red crab and Pacific krill) to the diets for pen-reared salmon and the uses of natural cartenoid supplements (now widely accepted in the culture of salmon).

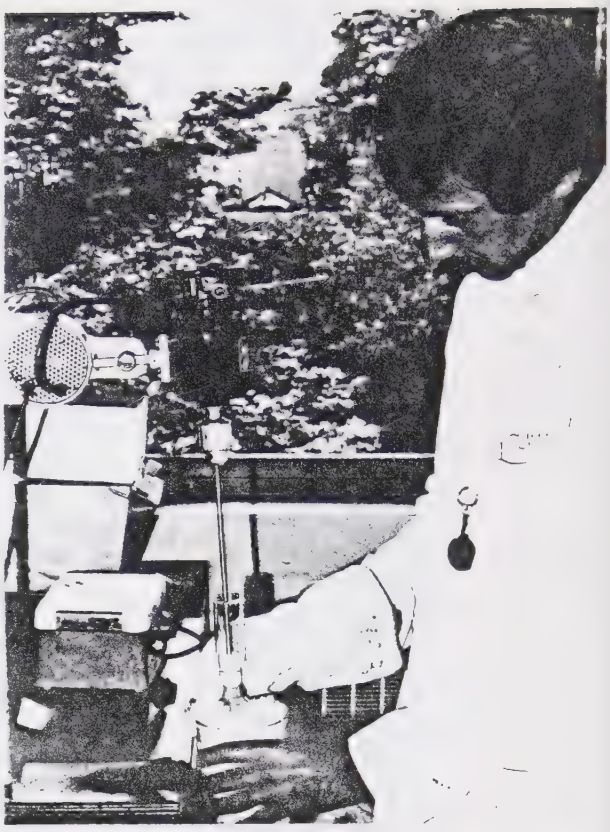

Figure 18.-NMFS Biologist preparing gill tissue samples for ATPase enzyme activity measurements.

AUKE BAY LABORATORY

o The 1977 returns of adult pink and coho salmon to the Auke Bay Laboratory (Alaska) experimental facilities on Auke Creek and at Little Port Walter showed that greatly increased production is possible through application of suitable techniques for (1) producing hatchery pink salmon fry of high quality, (2) rearing pink salmon fry in saltwater pens for a month before release to the ocean, (3) rearing coho salmon fry to yearling size in fresh and saltwater before release to the ocean, and (4) utilizing barren lakes for natural rearing of coho salmon fry before their migration to the ocean. In the course of these experiments, hatchery research and production resulted in the 1977 return of 24,000 adult coho salmon (see fig. 19) from a historical natural spawning stock of 500 fish (Little Port Walter) and 13,000 pink salmon (Auke Creek) from a spawning run that normally counted about 2,500 adults. The returns to Little Port Walter required a coordinated terminal harvest management system with the Alaska Department of Fish and Game. This harvest involved diverse user groups including troll, purse-seine, gillnet, and recreational fisheries. The significance of

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[3/] Biddle, K. 1977. The nutrition of Macrobrachium species. In: shrimp and prawn farming in the Western Hemisphere. Edited by Joe Hanson and and Harold Goodwin. Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pa. 1977.

this event sets the stage for developing management strategies that will involve both traditional and new fisheries. Direct value of this experimentally enhanced coho salmon run to commercial fishers approaches $250,000.

Figure 19.-Nine salmon purse-seine vessels maneuver in the inner part of the Little Port Walter estuary to harvest adult coho salmon returning to the NWAFC ocean ranching field station on Baranof Island. Five fishery openings for seiners, along with other openings for both troll and gillnet fisheries were used in 1977 to harvest the enhanced return of about 24,000 fish. This resulted from experimental releases on juvenile coho salmon cultured in estuarine net pens, floating raceways, and a nearby lake; all part of the salmon aquaculture research program of the Auke Bay Laboratory.

MARINE MAMMALS

The Marine Mammal Protection Act of 1972 (MMPA) charges NMFS to conserve and protect whales, porpoises, seals, and sea lions. MMPA imposes a moratorium (with exceptions) on taking and importing marine mammals and marine-mammal products, and stresses the importance of international cooperation, need for research, and necessity for regulating all activities relating to marine mammals within the jurisdiction of the United States.

Principal activities in administering MMPA are waivers of the moratorium; issuance of permits for incidental catch of marine mammals in commercial fishing, scientific research, and public display; enforcement; establishment of regulations to control the taking of marine mammals; research and surveys to determine the status of marine mammal population stocks; cooperation with the States; and participation in international agreements to conserve and manage marine mammals.

Bowhead Whales

Since 1931, bowhead whales have been protected from commercial whaling. However, each Convention and Act regulating the take has allowed the Indians, the Aleuts, and the Eskimos to hunt bowhead whales for subsistence needs (see fig. 20). At the 29th Annual Meeting (June 1977) of the International Whaling Commission (IWC), the IWC Scientific Committee recommended deleting the Native exemption provided under the Whaling Convention Act of 1949. The Commission accepted the recommendation by a 16 to 0 vote, with the United States abstaining.

Figure 20.-Eskimos watching for passing bowhead whales during their annual harvest along an open bend in the ice pack, Pt. Hope, Alaska.

During the 90-day period when the United States could legally file an objection to the decision, NMFS held informal public hearings in Alaska and Washington, D.C., and issued a Final Environmental Impact Statement that considered domestic, international, and environmental factors impacting on the decision to object to IWC. The U.S. decision not to file an objection was challenged by the Alaska Eskimos in a series of court actions ending with the Supreme Court upholding the Secretary of State's determination.

In recognition of the Native cultural need for bowhead whales, NMFS prepared a management and research plan to present to IWC at a special meeting held in December 1977. The United States recommended a whale harvest of 15 landed or 30 struck, whichever occurred first. IWC reviewed the plan and voted to allow a quota of 12 whales landed or 18 struck for the 1978 hunt.

Whale Research

Scientists from NWAFC conducted a cooperative study with IWC to develop a world data base for managing commercially harvested stocks of sei, minke, and sperm whales. Population estimates were developed from censuses, observation, and marking of animals, and analysis of catch and effort statistics.

The humpback whale population in Hawaii is being surveyed to determine abundance, distribution, and movements. A cruise along the 100-meter curve around the Hawaiian Islands resulted in a count of 411 humpback whales in 1977, compared with 373 in 1976. Improved radio tags were implanted successfully in five humpback whales and tracked for up to 5 days in Frederick Sound near Juneau. However, the

length of time that a radio tag will be retained by a whale is still unknown. The cetacean program also conducts censuses of the gray whale off California and is monitoring the distribution of movements of killer whales in Washington waters (see fig. 21). The 1976/1977 season gray whale count was the highest on record and continued the recent trend of increasing counts, which may indicate that the population is growing beyond its previously estimated size of 11,000. The photographic identification study of killer whales in Puget Sound was continued in 1977 and verified previous data on pod identities, degree of residency and distribution, and provided new information on calving rates.

Figure 21.-Killer whale showing a distinctive natural mark on dorsal fin used by NMFS scientists to identify individuals in their studies of population abundance, Puget Sound, Washington.

Whale research in Alaska assessed the effect of the Eskimo harvest upon bowhead whales in the Bering Sea and Arctic Ocean. In 1977, harvest monitoring crews reported that 29 bowhead whales were killed and recovered by Eskimos at the nine whaling villages; 3 were killed and lost; and 79 struck and lost. The counting station located on the ice at Barrow reported that 327 bowheads were seen passing by, compared with 357 in 1976.

Three-Year Tuna Porpoise Management Program

After October 20, 1974, MMPA prohibited taking marine mammals in the course of commercial fishing without a general permit and certificate of inclusion. There are five categories of general permits, all designed to reduce marine mammal mortality and serious injury. Five domestic general permits were issued to allow marine mammals to be taken in the course of commercial fishing through December 31, 1977.

Public concern over porpoise (dolphin) deaths, incidental to yellowfin tuna purse seining, reached a peak in 1976. Court actions resulted in a District Court order that prevented permits from being issued until the optimum sustainable population (OSP) of each species or stock of porpoise taken, and the effects of taking on these populations, had been determined.

A workshop of prominent international scientists convened in July 1976 to estimate the population levels of the various species and stocks of marine mammals affected by the tuna purse-seine fishery. For the first time, the report of the workshop provided sufficient scientific information concerning optimum sustainable populations to meet the requirements of MMPA.

Following the workshop, NMFS proposed regulations to govern the taking of marine mammals in the course of commercial yellowfin tuna purse-seine fishing. The proposed regulations were extensively reviewed during public hearings before an Administrative Law Judge (ALJ). The ALJ made his recommended decision to the Director, NMFS, on January 17, 1977. The Director's decision, based on the ALJ decision and the public hearing record, was published with final regulations in the Federal Register on March 1, 1977. On April 15, 1977, a general permit was issued to the American Tunaboat Association authorizing fishermen to take incidentally a limited number of porpoises while purse seining for tuna during 1977. In addition to mortality limits, the general permit establishes limits on the allowed take and encirclement of individual stocks.

The tuna industry and environmental groups challenged the regulations and general permit conditions. The industry felt the decision to consider the eastern spinner dolphin as depleted was over-reactive and unsupported by the data available. They thought vessel masters would be subject to severe penalties for not detecting a small number of eastern spinners in a large school of other species of porpoises until the entire group had been encircled. Also, they did not agree with the original quota of 7,840 whitebelly spinners. Therefore, the United States tuna vessels remained in port until mid-May to emphasize their disapproval. On May 4, 1977, NMFS published in the Federal Register an enforcement policy statement that made a purely accidental take of eastern spinner, by itself, not a cause for issuing a notice of violation.

Several environmental groups challenged the regulations based on alleged inadequacies in the statements made in compliance with MMPA. A motion was denied for a preliminary injunction.

Proposed regulations published July 20, 1977, authorize the taking of porpoises incidental to tuna purse-seine fishing for three years (1978-1980). The proposed amendments are designed to: authorize issuance of a general permit for 3 years rather than 1 year; establish quotas for calendar year 1978, 1979, and 1980; state an enforcement policy regarding accidental takings; amend gear and fishing procedure requirements; and provide administrative procedures for amending the regulations

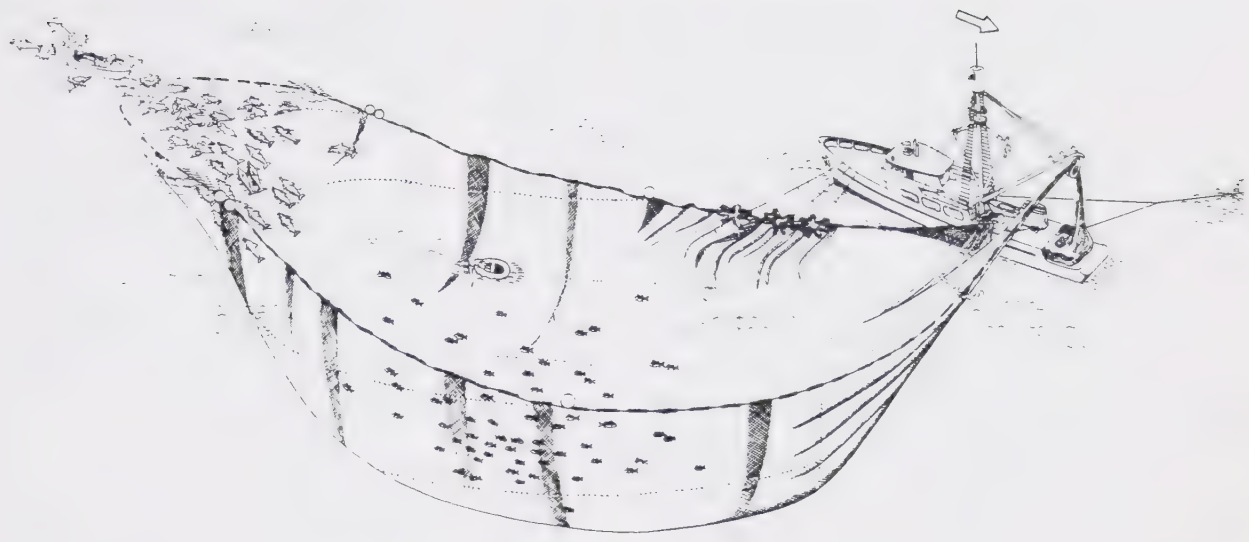

Figure 22.-Artist's conception of backdown procedure, using the super-apron net modification and showing a rescuer on a raft herding porpoise toward the release area located in the backdown apex of the purse seine. Note ramp shape formed by the super-apron that may be compared to the lip on a pitcher.

and permit conditions. A Draft Environmental Impact Statement (DEIS) on the proposed regulations was made available for public comment on August 19, 1977. The Final Environmental Impact Statement (FEIS) was filed with the Council on Environmental Quality on November 25, 1977. Public hearings were held before Administrative Law Judge (ALJ) Frank W. Vanderheyden in August 1977 in San Diego, California, and in September in Washington, D.C.; opening and reply briefs were served, and oral arguments heard. After the ALJ's recommended decision was served on November 4, 1977, much of it was adopted in the NOAA Administrator's final decision. Full details of the final decision were published, along with the final regulations, in the Federal Register, December 23, 1977.

The 3-year quota program establishes the numbers of marine mammals that can be taken during calendar years 1978, 1979, and 1980, by U.S. vessels in the course of commercial fishing. The 3-year general permit system allows continuity in management of the porpoise stocks to achieve a steady reduction in incidental porpoise mortality. The 3-year quota by species represents a 50-percent reduction in mortality by 1980 from the 1977 aggregate quota level of 62,429. The quotas are 51,945 in 1978, 41,610 in 1979, and 31,150 in 1980.

A general permit issued to the American Tunaboat Association on December 27, 1977, is valid from January 1, 1978, to December 31, 1980.

The new regulations incorporate not only the 1977 enforcement policy for incidentally taking eastern spinner, but cover other prohibited species as well. The new regulations require the same porpoise protection gear with one major addition. Large purse seiners must install a porpoise apron (see fig. 22) and conduct a trial set under NMFS supervision before July 1, 1978. A joint NMFS/industry test found the apron/chute system superior to the fine mesh safety panel alone. Therefore, the porpoise apron, if properly installed and operated, should reduce porpoise mortality significantly over the presently required 1 1/4-inch fine mesh webbing system. Other porpoise release gear or procedures remain unchanged.

Observers will be placed on each certified vessel for at least one trip per year from 1978 through 1980. Observers are able to monitor individual species and stock quotas, minimize bias in the data, and provide a continuing profile of the performance of each individual operator and certified vessel.

Importing Tuna

Regulations govern the importing of fish and fish products caught in connection with marine mammals. They allow NMFS to prohibit the importation of yellowfin tuna and tuna products from nations involved in the eastern tropical Pacific (ETP) purse-seine fishery, unless they are fishing in compliance with U.S. rules.

Public Display and Scientific Research Permits

Although MMPA declares a moratorium on the taking or importing of marine mammals and marine mammal products, it includes exceptions that allow continuing research on marine mammals and taking of marine mammals for public display, as long as the health and well-being of the species and populations involved and the marine ecosystems are not adversely affected. Permits are granted only after the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals have reviewed the application.

At the beginning of 1977, 22 permit applications were pending action. During the year, 41 permit applications were received. Of these 63 applications, 51 were approved, 2 were combined, 2 withdrawn, and 8 remain under consideration.

A major consideration in issuing permits to capture and maintain marine mammals for either scientific research or public display is the quality of care provided. Soon after passage of MMPA, NMFS developed requirements for marine mammal care and maintenance that are now used as criteria for all permits involving captive marine mammals.

Since 1972, NMFS has worked closely with the Marine Mammal Commission, the Fish and Wildlife Service (FWS) of the Department of the Interior, and the Animal and Plant Health Inspection Service (APHIS) of the Department of Agriculture, representatives of the marine mammal display industry, and concerned public groups to develop comprehensive standards for the care and maintenance of captive marine mammals.

State of Alaska Marine Mammals

MMPA allows return of management to individual States if a State's laws are consistent with MMPA, and if rules and regulations established by the Federal Government are followed.

In 1973, the State of Alaska applied to the Secretary of Commerce to waive the moratorium on northern sea lions, belukha whales, and harbor, spotted, ribbon, ringed, and bearded seals and return management of those species to the State. A simultaneous request was made to the Secretary of the Interior regarding walruses, sea otters, and polar bears. A hearing on the State request and a subsequent Federal proposal was held in 1976 before an Administrative Law Judge (ALJ). On June 30, 1977, the ALJ submitted his recommended decision which found the proposal in accord with the terms and policies of the Act. Based upon the hearing record and the recommendations of the ALJ, NOAA's Administrator will decide whether or not it is appropriate to waive the moratorium and return management of the requested species to the State. Before actual management is returned, the State will have to comply with certain requirements of the MMPA.

Marine Mammal/Commercial Fishery Conflicts

The conflict over protecting porpoises from tuna purse-seine nets has received widespread attention; however, other problems exist between fishers and some species of marine mammals. For example, the exploitation and interest in krill in the Antarctic is increasing. Many marine species, including endangered whales, depend upon krill for food. This issue will be discussed early in 1978 at the special Ninth Consultative Meeting of the Parties of the Antarctic Treaty.

Another conflict involves marine mammals taking hooked fish from commercial fishing gear. A workshop sponsored by the Marine Mammal Commission on this subject was held in December 1977, in Seattle, Washington. Further, some species of marine mammals, such as seals and sea otters, feed heavily on commercially important marine resources. Some studies indicate that the fur seal populations are decreasing because of heavy fishing of Alaska pollock in the Bering Sea. On the other hand, fishers insist sea otters are the reason for the declining stocks of abalone. Under MMPA, foreign fishers must have permits to take marine mammals while fishing in the U.S. Fishery Conservation Zone (FCZ). Foreign associations representing fishers from Bulgaria, German Democratic Republic, Japan, Republic of Korea, and the U.S.S.R., submitted ten applications for general permits to take marine mammals during 1977 in the U.S. FCZ. Future commercial fishing, foreign and domestic, could be affected by the numbers and kinds of marine mammals harvested incidentally in the U.S. FCZ.

Northern Fur Seals and Pribilof Islands Management

Under the provisions of the Fur Seal Act of 1966 (the Act), the Secretary manages northern fur seals and administers a major breeding ground, the Pribilof Islands. The Act implements for the United States a treaty between Canada, Japan, United States, and U.S.S.R. to protect northern fur seals throughout their distribution. The Act and Convention require NMFS to conduct a harvest of fur seals, to conduct scientific research of the fur-seal herds, to employ Natives of the Islands, and to provide for their welfare.

Under the Alaska Native Claims Act of 1971, the Natives of the Pribilofs will receive over 90 percent of the land of the Islands. The rest will be retained by the Federal Government to operate facilities and protect the fur seals as required by the treaty. Because the separately owned lands and facilities are adjacent and will

be used by both the Native corporations and the Federal Government, an agreement for joint use was negotiated. The agreement includes a Memorandum of Understanding Regarding Pribilof Islands Land Selection and an arrangement to establish the Pribilof Islands Joint Management Board.

In 1977, commercial harvesting of the northern fur seal was conducted only on St. Paul Island. Since 1973, and for an indefinite period, St. George Island has been designated as a conservation area for scientific research on northern fur seals through an agreement with the governments involved in the treaty. These governments also agreed on a small native subsistence harvest on St. George. This amounted to 350 seals in 1977. The commercial harvest of fur seals on St. Paul Island for 1977 was 28,280; the U.S. share was 19,796.

Research on the northern fur seal is concentrated on the Pribilof Islands and in the Bering Sea. Current abundance is measured through counts of adult males and the number of pups that die on land, by estimating the number of pups born, and from information obtained about the age composition of harvested seals. The results of population assessment research are correlated with the results of biological research carried out on fur seals on St. George Island. A moratorium imposed on the harvest of fur seals on that island beginning in 1973 set the stage for obtaining critically needed information to determine the optimum population level. A joint United States-Canada analysis of data collected at sea by both countries from 1958 through 1974 is underway to obtain information to calculate the productivity of the fur seal resource. A program of physiology and medicine is developing new methods of marking fur seals for long-term identification of individuals and is determining causes of death among the pups during the summer of birth.

Northern Fur Seals and San Miguel Island

San Miguel Island, off the California coast, is home to a small colony of northern fur seals. Discovered in 1968, the colony had 28 pups in 1969; another colony located on nearby Castle Rock in 1972 had 95 pups. Together, these colonies contained about 1,000 pups in 1976 and 1977, and are being monitored annually as an unparalled opportunity for studying the dynamics of a new, fast-growing population of northern fur seals.

ENDANGERED SPECIES

Under the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1543), NMFS manages and conserves endangered and threatened species of fish and wildlife. The U.S. Department of Commerce has jurisdiction over these listed endangered species: blue, bowhead, fin, gray, humpback, right, sei, and sperm whales; Hawaiian and Mediterranean monk seals; shortnose sturgeon; and leatherback, hawksbill, and Atlantic ridley sea turtles. Jurisdiction over sea turtles is currently shared with the U.S. Department of the Interior.

ESA, with certain exceptions, prohibits taking, importing, or exporting endangered species and their parts or products. For threatened species, ESA authorizes discretionary rulemaking to provide for species conservation. Administrative responsibilities include: (1) developing and reviewing policy and regulations; (2) conducting and being represented at required hearings; (3) reviewing and studying State laws and regulations, management programs, and compliance with Federal regulations; (4) handling grants and contracts for developing and implementing State programs for the protection of endangered and threatened species; (5) consulting with other Federal agencies on actions that may jeopardize endangered or threatened species or destroy/modify critical habitat; and (6) issuing permits for takings and imports or exports that involve scientific research, enhancement of propagation, or survival. The decision to grant or deny a permit application requires a thorough review of the application. It may include scientific evaluation by State and NMFS officials and inspection of the applicant's facilities. Public comments are solicited and considered on each application.

NMFS has published regulations governing State-Federal Cooperative Agreements and grant-in-aid awards along with a model for Cooperative Agreements. Although various coastal States have expressed interest in a Cooperative Agreement with NMFS, most States are reluctant to enter into an agreement in the absence of Federal funding for this purpose. Although appropriations to NMFS for administrative, research, and enforcement activities under the ESA were received in 1977, no funds have been appropriated for financial assistance to the States.

Enforcement of the provisions of ESA centers on prohibiting unauthorized importation of endangered species and their parts or products, and controlling the taking, possession, sale, delivery, and transporation of the listed species in the United States. Activities authorized by permit are monitored.

o During the first 6 months of 1977, NMFS conducted over 250 endangered species enforcement investigations and collected more than $46,870 in penalties. Under NMFS regulations governing pre-Act commercially held endangered species parts and products, 48 Certificates of Exemptions were issued in 1977.

o Six scientific purposes permits for shortnose sturgeon, endangered sea turtles, and several endangered whale species were issued.

o NMFS published proposed regulations in January 1977 (42 F.R. 4873) on interagency cooperation and critical habitat responsibilities under Section 7 of ESA. Final regulations were prepared later in the year that require formal consultations for biological opinions. During 1977, NMFS was involved in various informal Section 7 consultations.

o To develop an adequate data base for all endangered marine species and in response to the President's Environmental Message of May 23, 1977, NMFS is emphasizing identification of critical habitat for endangered species. In December 1977, NMFS and FWS held a workshop with other Federal agencies to enlist their support in identifying critical habitats.

o During NMFS enforcement surveys in the Caribbean, previously unknown nesting areas for the leatherback and hawksbill turtles were observed on Mona Island off Puerto Rico. Leatherback turtles were also found nesting on Sandy Point Beach, St. Croix, Virgin Islands. Sandy Point Beach is under consideration for designation as a critical habitat.

o As a result of a NMFS contract with the Virgin Islands, 1,810 hatchling turtles, attracted by inland lights, were salvaged and placed in the sea.

o The Caribbean monk seal was proposed as an endangered species in February 1977 (42 F.R. 9402).

o NMFS established and leads a recovery team for shortnose sturgeon made up of nongovernment sturgeon researchers. The team members exchange data, review technical reports, identify research and management needs to restore shortnose sturgeon, and contract sturgeon research. The team convened a 2-day national workshop on the species in August 1977 in Philadelphia.

o During 1977, NMFS made censusing and life history studies on the Guadalupe fur seal as a candidate for future listing. NMFS is also considering the Key silversides (Florida Keys) for possible future listing and, in response to a December 1977 petition, the American eel (New England).

o The Hawaiian monk seal was further studied in 1977 for population trends and habitat requirements.

o Research on endangered whales is funded under both ESA and MMPA. As indicated under the Marine Mammal section of this report, sei, sperm, humpback, gray, and bowhead whales were studied. Whale stock assessments, population trends, biology (age, growth, and reproductive history) were studied. Harvest monitoring and tagging studies were also performed to determine more accurately the current status of exploited stocks throughout the world. Whaling observer studies and other programs recommended by the IWC were also undertaken in 1977.

o To administer more effectively the sea turtle programs, interagency jurisdiction was clarified by a July 1977 Memorandum of Understanding. It was agreed NMFS has single agency jurisdiction over turtles in the water; the Department of Interior's Fish and Wildlife Service (FWS) will have jurisdiction over turtles on land.

o NMFS sea turtle research in 1977 included stock assessments and habitat surveys for improved management techniques and possible critical habitat designations and gear development (a sea turtle conservation shrimp trawl) to reduce the incidental catch of sea turtles by shrimp trawls. Incidental catch by commercial fishers has had a detrimental effect on sea turtle populations. NMFS is working to protect and restore sea turtles and at the same time avoid serious injury to the shrimp industry. Also, a study in captive rearing of sea turtles was initiated.

o The NMFS Southeast Region and Fisheries Center began a cooperative program with the National Park Service, FWS, and the Texas Parks and Wildlife Department to save the Atlantic ridley sea turtle.

o In an advisory capacity to the Management Authority of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (July 1975), NMFS participated in the development of U.S. policy, regulations, and an identification manual for implementation of the Convention. Implementing regulations were published by FWS (Management Authority) and became effective on May 23, 1977 (42 F.R. 10462). The import, export, re-export, and introduction from the sea of Convention animals are controlled by the U.S. Management Authority for the Convention through a system of permits and enforcement. Appendix I and II list endangered species receiving protection under the Convention. Trade is more strictly controlled for Appendix I species.

o As a member of the Scientific Authority of the Endangered Species Convention, NMFS evaluates applications for permits to trade in Convention species and participates in the development of U.S. policy for trade under the Convention.

HABITAT PROTECTION

NMFS' habitat conservation program is based on the Department's habitat conservation goal[4/], which is to "restore, maintain, enhance, and utilize, in a rational manner, fisheries resources of importance to the United States," and thus "conserve, restore, and enhance fish habitats." To achieve this, NMFS provides environmental impact analyses and conducts environmental research to minimize damage to marine and estuarine living resources and their habitats. These programs are carried out by environmental assessment specialists and researchers in the Regions, Research Centers, and Central Office.

o NMFS completed a major review of the degradation of our shellfish beds in March 1977. These results are presented in the report, "Water Quality and Molluscan Shellfish: An Overview of the Problems and Nature of Appropriate Federal Laws." It was prepared as a supporting document to the Secretary's Report on "The Molluscan Shellfish Industries and Water Quality: Problems and Opportunities," which was requested by Section 16 of the Coastal Zone Management Act Amendments of 1972 (Public Law 94-370), and submitted to the Congress on September 2, 1977. The report analyzes the effectiveness of Federal pollution control laws on the molluscan habitats and the shellfish industry.

o NMFS provided comments for consolidated NOAA responses to the Bureau of Land Management (BLM) on several proposed Outer Continental Shelf (OCS) Lease Sales in the Gulf of Mexico, along the Atlantic Coast, and in Alaska waters, and reviewed the lease sales as mandated by the National Environmental Policy Act. NMFS contributed significantly to NOAA comments now reflected in revised Department of the Interior (DOI) Outer Continental Shelf Orders and Lease Stipulations. Also, NMFS reviewed and provided comments to the NOAA OCS Environmental Assessment Program (OCSEAP) on the nine Technical Development Plans describing individual research projects for each proposed Alaska OCS Lease Area.

Regional Activities

o In the Northeast Region major developmental permit applications and navigation projects reviewed during 1977 were related to shore erosion and beach nourishment proposals, alternatives to ocean disposal of dredge spoil, and unauthorized projects in wetlands and other inshore areas. The trend towards better coordination and assessments in these cases among State and Federal agencies continues: Joint processing of permit applications has been extended and refined, and interagency committee action for finding area solutions to dredge spoil disposal has increased.

o Scientists in the Southeast Region wrote and published a review paper, "Alteration and Destruction of Estuaries Affecting Fishery Resources of the Gulf of Mexico" (Marine Fisheries Review, Septmber 1977). It describes the dimensions of major natural features and manmade alterations of Gulf of Mexico estuaries. The purpose is to inform fishery interests and the public of the importance of the Gulf's estuaries and the extent to which they have been altered.

o NMFS biologists in the Northwest Region were witnesses for the Washington Department of Fisheries (WDF) in a hearing before a hearing examiner from the Washington State Facility Site Evaluation Council concerning a loss of fall chinook salmon downstream from Priest Rapids Dam on the Columbia River. The hearing examiner's proposed findings were in favor of the WDF.

o In 1977, the Alaska Region's activities centered essentially in four areas; OCS oil and gas leasing and associated developments (timber harvesting, mining, and coastal zone planning).

o NMFS worked with a consortium of oil companies in developing a study to determine the effects of offshore drilling on Lower Cook Inlet organisms.

o Considerable effort was expended by Regional and Center personnel in reviewing OCSEAP Task Development Plans for FY 78; NMFS comments were directed to improve future planning of environmental investigations in Alaska waters. In particular, NMFS noted and expressed concern over the exclusion of Prince William Sound from OCSEAP studies.

o Timber harvesting, a major industry in southeast Alaska, continued to demand a large share of staff time through participation on the Forest Service (FS), U.S. Department of Agriculture, Interdisciplinary Teams (IDT). Participation on IDTs and the FS Fishery Task Force for both long-term (5 years) and individual timber sales resulted in guidelines for protection of marine and freshwater fish habitat.

o NMFS participated in surveys in marine and riverine areas that could be affected by the proposed U.S. Borax Company's molybdenum mine near Ketchikan. As a result of these and surveys by other agencies, the productive Wilson and Blossom Rivers and Wilson Arm of Smeaton Bay were protected from exploratory and bulk sampling impacts.

4/ A Marine Fisheries Program for the Nation (p. 4, 6). Sold by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 (Stock No. 003-020-00123-8).

o The Alaska Coastal Management Act of 1977 provides for establishment of the Alaska Coastal Policy Council. The Alaska Region assisted this Council in developing guidelines and standards for coastal management programs and by providing detailed information to the Alaska Coastal Management Program regarding the national interest in marine fisheries off the coast of Alaska.

ENVIRONMENTAL INVESTIGATIONS

At the Southwest Fisheries Center, a major accomplishment of researchers was the demonstration of the first true physiological thermal regulation in fish. Free-swimming yellowfin tuna were exposed to a water temperature schedule for selected periods of time and temperatures of the deepest layer of red muscle were measured by a temperature-sensitive ultransonic transmitter. Results indicate that yellowfin tuna are able to regulate body temperature excesses independently of activity--strong evidence of a true physiological thermal regulatory response. Knowledge of this physiological capability in tunas will have important implications for studies of the abundance and distribution of these fish.

o A Southeast Fisheries Center study conducted at the Miami Laboratory to determine the accumulation and elimination of chrysene (a petroleum-derived polynuclear aromatic hydrocarbon) by pink shrimp and mangrove snappers has been completed. The significance of this study is that the study organisms did accumulate large amounts of chrysene and did not eliminate it at a very fast rate. Human consumption of organisms containing large amounts of this chemical presents a potential human health hazard.

o The Southeast Fisheries Center is conducting a biological/chemical survey of proposed salt dome brine disposal sites off Louisiana by the Environmental Research Division. The work, supported by the Department of Energy through an Interagency Agreement with NOAA, will be accomplished primarily through contracts with universities and private environmental research firms. Target date for initiation of field work in the Capline and Texoma areas off Louisiana is April 3, 1978.

o Northeast Fisheries Center scientists at the Oxford Laboratory have studied the nature and extent of diseases in marine mollusks, crustaceans, and fishes. Studies with crustaceans included detailed observations on the types of, and changes in, normal tissues and organs of the blue crabs, and eletron miscroscopy of fouling organisms (bacteria, diatoms, protozoa) involved in the black gill disease of New York Bight rock crabs. Work with fishes indicated that a newly discovered bacterium was the cause of certain lesions on summer flounder, and that an as yet unidentified gram-negative bacterium caused a large die-off of striped bass in western Long Island Sound during autumn.

o The Northeast Fisheries Center's Sandy Hook Laboratory emphasized the Ocean Pulse Program, a Center effort to assess and monitor environmental conditions along the Northwest Atlantic Continental Shelf. Operational test-phase cruises made collection and analyses at contaminated and uncontaminated stations.

o Sandy Hook Laboratory scientists studied the impact of low dissolved oxygen levels in the Mid-Atlantic Bight on surf clams and important forage fish species. The causes of the low dissolved oxygen, which occurred in 1976 as well as in 1977, were also studied.

o Northeast Fisheries Center scientists played a key role in the study of the effects of the sinking of the oil tanker, Argo Merchant. Biochemical, environmental, and physiological measurements were made of biological materials collected during and after the spilling of oil from the vessel.

o The Sandy Hook Laboratory continued its study of environmental conditions in the New York Bight. Baseline information was developed on the distribution of organic contaminants and heavy metals in the Bight. It was also found that such highly stressed environments as the Bight can increase the numbers of phytoplankton produced as well as changing the species of phytoplankton. The results of this latter finding also suggest that much of the primary food production in stressed environments is in a dissolved organic state that is generally unavailable to the rest of the food web.

o Northwest and Alaska Fisheries Center's major emphasis during 1977 in the environmental areas at the Seattle Laboratory was on studies to determine the potential impact of relatively low levels of petroleum on marine organisms. Studies on impact of petroleum involved identification and distribution of metabolites after exposure of organisms to aromatic hydrocarbons, determination of effects from interactions between petroleum hydrocarbons and metals (lead and cadmium) or polychlorinated biphenyls (PCBs); effects of petroleum hydrocarbons on feeding, reproduction, and avoidance responses in fish and shellfish and on homing salmon, and impact of petroleum-contaminated sediments on English sole. Fish diseases in the natural environment were studied, and the incidence of abnormalities in demersal fish of the Bering Sea and Norton Sound-Chukchi Sea was determined. Staff members were also involved in studies after oil spills in the North Atlantic (Argo Merchant) and in the Baltic Sea.

o Environmental research at NWAFC Auke Bay

Laboratory on effects of oil on Alaska marine organisms was intensified in 1977. More than 30

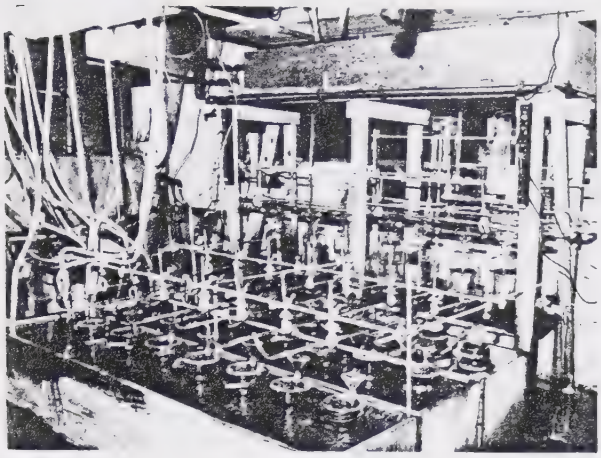

Figure 23.-All-glass apparatus used in flow-through bioassays to test the toxity of various hydrocarbon components of crude oil. This device continuously makes a stock solution of toxicant that is diluted appropriately to yield different concentrations for the assays. Concentrations of hydrocarbons were periodically monitored by U.V. spectrophotometry and confirmed by gas chromatography in these experiments.

species of Alaska organisms were tested in the laboratory to determine their sensitivity to petroleum hydrocarbons under a variety of controlled conditions (see fig. 23). It was found that toxicity is highly dependent on the particular oil compound, temperature of the water, duration of exposure, and life stage of the organisms. The effects of temperature on sensitivity of organisms to oil is especially complex and found to vary between species. For example, pink salmon fry are more sensitive to the benzene component of oil at lower temperatures. Long-term sublethal toxicity experiments were emphasized in 1977 to provide a basis for evaluating potential effects of oil spills on natural populations, characterized by chronic exposure to low levels of oil.

o The long-range multiagency research plan to determine the possible effects of intensified logging operation on salmon production in Southeastern Alaska was implemented with the selection of Porcupine Creek/Steamer Bay on Etolin Island as the research site (see fig. 24). Experimental techniques were developed and refined to determine the role of aquatic life stages of insects in the diet of resident salmon, determine the relationship of forest canopy to stream nutrients, and study interactions of populations of anadromous fish in the stream and of invertebrate populations in the estuary.

o The Auke Bay Laboratory also participated in two other interagency studies with the U.S. Forest Service: (1) effects of removal of logging debris on a stream ecosystem and (2) effects on winter stream temperatures of clear-cut logging.

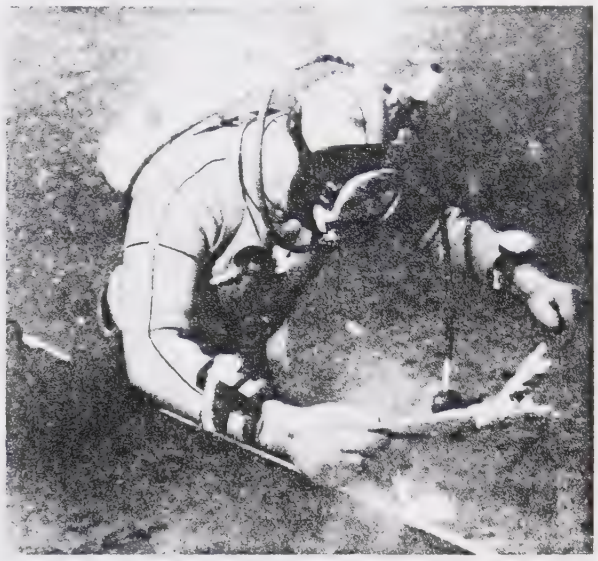

Figure 24.-NMFS diver sampling along a transect adjacent to a log-dumping area.

o NWAFC carries out research on the ecological effects of dams in concert with Columbia River Fishery Development Program. NWAFC and the Environmental and Technical Services personnel spearheaded a two-part action plan to save millions of downstream migrant salmon and steelhead trout threatened by the drought in the Pacific Northwest. During the critical downstream migration period for juvenile salmonids, the Columbia and Snake Rivers experienced their lowest flows in history. With no spilling at the many dams that impede fish migration to the sea, virtually all of the smolts from the upriver areas would have been killed while passing through turbines and reservoirs of successive hydroelectric projects. "Operation Fish Flow" was carried out to save juvenile salmonids in the Columbia River, while "Operation Fish Haul" was implemented to save salmonids in the Snake River (see fig. 25). To improve passage conditions for smolts migrating down the Columbia River, river flows downstream from Grand Coulee Dam were augmented by the release of stored water to provide additional flow and limited spill at downstream hydroelectric projects. Based on monitoring programs by NMFS, sequential releases were fine-tuned to spill only at the optimum time for maximum fish passage enhancement at each dam. Because of the precision of the data, effective passage was achieved with less than 58 percent of the 2.4-million-acre-feet of valuable water allocated for Operation Fish Flow. Operation

Fish Haul involved capturing migrating fish at Lower Granite Dam on the Snake River and taking them by truck, barge, and plane around intermediary dams to safe release sites in the lower Columbia River. Additional smolts were barged directly from upriver hatcheries to the lower river release sites. The action plan was successful because of the cooperation of all State and Federal fishery agencies and the support of the U.S. Army Corps of Engineers, the Bonneville Power Administration, local Public Utility Districts, the Federal Energy Regulatory Commission, and the Governors of Washington, Oregon, and Idaho. In addition to avoiding the possible extinction of some important races of fish, the short-term benefits are estimated to range between 391,000 and 462,000 returning adults. The immediate worth of these adults is from 12.7 to 16.5 million dollars, while the costs for the program depending on the cost of the rate used, are estimated at between 3.2 and 9.4 million dollars. The rate using average thermal replacement would be 24 mills per kilowatt-hour while the unusual nonfirm rate would be 3.5 mills per kilowatt-hour.

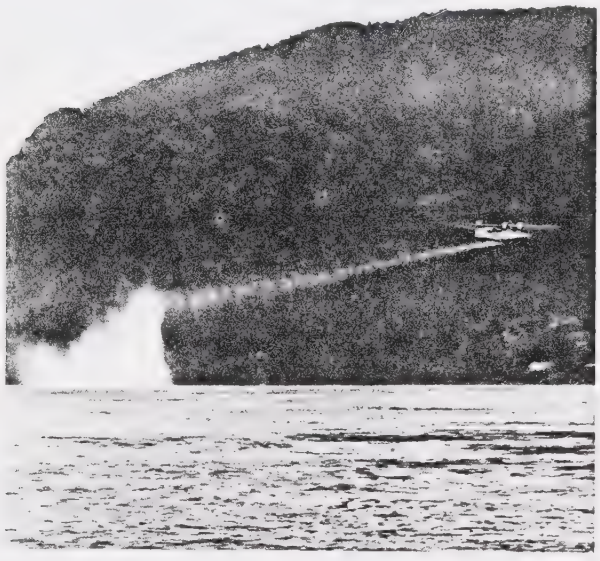

Figure 25.-Juvenile chinook salmon being released into the lower Columbia River after being transported from the upper Snake River by plane.

COLUMBIA RIVER FISHERIES DEVELOPMENT PROGRAM

The Columbia River Fisheries Development Program (CRFDP) helps preserve and maintain the anadromous fisheries of the Columbia Basin. The Program has sponsored the construction of 86 fishways, 720 fish screens, and the construction and operation of 22 hatcheries and 7 rearing ponds.

The severe drought conditions that faced the Pacific Northwest in 1977 moderately affected this program. Low-water flows and warm temperatures caused minor inconvenience and disease problems. Despite these problems, Program hatcheries released about the same numbers and pounds of fish released in 1976.

o Two experimental rearing ponds at the Trojan Nuclear Plant were completed and are awaiting a heat-exchanging unit that will be used to temper winter-rearing temperatures to accelerate the growth of young steelhead trout. Additionally, a large rearing pond on the Clackamas River is under construction and is scheduled to be activated in summer 1978 as a satellite of a new Oregon Department of Fish and Wildlife hatchery. This pond will rear 200,000 spring chinook annually.

o Structural designs for pollution abatement facilities were completed on some Columbia River hatcheries including Little White Salmon, Washougal, Elokomin, Grays River, Toutle, Klickitat, Big Creek, and Cascade Hatcheries. A contract was granted and construction completed at Skamania Hatchery. Structural design continued on the facilities for Carson and Beaver Creek Hatcheries, leaving only three stations without completed plans for construction of pollution abatement facilities.

o Engineering tasks within CRFDP are performed by three hydraulic engineers and one biologist. The primary responsibility of this unit is to assist in developing functional designs for fish protective facilities at Federal or Federally funded water development projects and at projects licensed by the Federal Energy Regulatory Commission. NMFS is concerned primarily with projects in the Columbia River Basin, but frequently aids in designing fish facilities for projects throughout the country.

o During the past year, NMFS has been involved in planning and design review of fish facilities for more than 10 water development projects and has inspected fish passage and fish protective facilities at 13 major dams and 11 water diversion projects. Most of these were in the Northwest Region, but locations ranged from Maine to Alaska. On the Columbia River, NMFS continued to plan and develop fish passage facilities for new powerhouses at Bonneville and Rock Island Dams. Each of these new projects will require elaborate fish-collection facilities, fish bypasses, and fish ladders to permit adult and juvenile salmon to pass safely around these projects during their upstream and downstream migrations. NMFS also reviewed and assisted in developing designs for fish screens at numerous irrigation, industrial, and thermal powerplant water diversions on the Columbia River.

PUBLIC AFFAIRS

Detailed to OF/NMFS and supervised by the NOAA Director of Public Affairs, the Public Affairs Officer and his staff provide liaison with NOAA in all public affairs activities. Considered as part of the staff of the Assistant Administrator for Fisheries, the Public Affairs Officer maintains contact with the NMFS Assistant Directors in the Central Office and the Regional and Center Directors in the field.

The Public Affairs Officer:

o Prepares national news releases and feature items that reach as many as 1,500 news outlets across the Nation.

o Prepares articles for each issue of the quarterly periodical NOAA, and for U.S. Department of Commerce and other Federal publications (reprints of some of the articles are used throughout NOAA/NMFS for answering letters and various inquiries).

o Arranges interviews of NMFS personnel with representatives of all media.

o Responds to inquiries from the press, radio, and television, as well as the general public.

o Maintains contact with Regional Offices and Centers on matters of public interest, and prepares news items for release by Regional Directors.

o Provides representation at certain fisheries functions throughout the United States.

o Coordinates or prepares brochures, pamphlets, and similar material.

o Helps prepare materials for local and national fisheries exhibits.

o Covers newsworthy events as required in the various NMFS Regions.

o Prepares speeches for Assistant Administrator for Fisheries and his Deputy. Reviews speeches of NMFS Assistant Directors.

RESEARCH VESSELS

During 1977, NMFS field research activities used over 5,000 sea days of ship support. (Ship support for law enforcement activities under FCMA is the responsibility of the U.S. Coast Guard and is not included here). Table 2 shows the source of ship support.

Table 2.--1977 NMFS Research Ship Support

Source	Percentage (%) of total sea days
NOAA fleet	36
NMFS small craft	19
Chartered ships	19
Donated time	12
Foreign ships	10
Other	4
Total	100

o In 1977, a total of 14 NOAA vessels contributed sea time to NMFS program efforts. Nine of these were almost fully dedicated to NMFS programs. The NOAA fleet is centrally managed and operated by the National Ocean Survey.

o There are 13 small craft between 26 and 65 feet in length managed and operated by NMFS field facilities (mostly research laboratories). These boats are generally dedicated to specific task groups and are operated by scientific personnel.

o Twenty-eight vessels were chartered during 1977. Charter periods ranged from 1 to 100 sea days. The vessels ranged in size from 28 feet to the then largest tuna seiner in the U.S. commercial fleet of 242 feet.

o Ship time was donated to NMFS field programs by States, universities, commercial fishing industry, and private citizens. Most donations were part of a cooperative work program between NMFS and the donor.

o A special kind of donated ship time came from foreign sources. Canada, Federal Republic of Germany, France, German Democratic Republic, Japan, Mexico, Poland, and U.S.S.R. all donated some time. Most of this effort went toward resource surveys.

o A small proportion was some sea days provided as part of paid research contracts and by other miscellaneous sources.

About three-fourths of all 1977 ship time was expended in support of Resource Assessment (MARMAP) activities. The rest supported marine mammal, recreational fisheries, and environmental assessment research.

PROGRAM PLANNING, BUDGET AND EVALUATION

Program and financial analysts advise the Assistant Administrator for Fisheries on planning and programming, coordination, budget formulation, execution, and evaluation of programs in achieving NMFS' mission, goals, objectives, and policies. In addition, they coordinate major NMFS activities with other NOAA elements, Federal agencies, public and private organizations; coordinate the formulation, justification, and presentation of programs and budgets; evaluate the effectiveness of programs and activities; assist in executing operating budgets; analyze authorized programs and recommend changes to accomplish the optimum use of funds and manpower; and monitor and administer NMFS' grant-in-aid programs conducted under Public Laws 88-309 and 89-304, as amended.

Major accomplishments in 1977:

o Applied the Zero Base Budgeting approach to the fiscal years 1979 and 1980 budgets.

o Updated a draft implementation plan for the Secretary's "A Marine Fisheries Program for the Nation."[5/] The Plan is designed to also reflect major recommendations from the Eastland Survey and other Congressionally mandated studies. (It is being developed and refined and is expected to be approved by the Secretary sometime in 1978.)

Table 3.--Budget summary for Fiscal Year 1978

Source	Adjusted base FY 1978	Congressional increase	Total FY 1978
	.....Thousands of dollars.....		
Direct appropriations*	77,593	8,130	85,723
S-K Funds	9,069	--	9,069
Totals	86,662	8,130	94,792

* Do not include: (1) assets of the Fisheries Loan Fund that are based on repayments of loans and interest payments; (2) fees paid into the Fishermen's Guaranty Fund for participation in the program, including executive direction and administration, and other services provided by NOAA; (3) indirect budgetary resources available to NMFS from reimbursements and trust funds; (4) funds for NMFS vessels managed by NOAA's National Ocean Survey.

5/ Sold by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. (Stock No. 003-020-00123-8)

o Started two in-depth evaluations of ongoing NMFS programs and identified several others for future review.

BUDGET

To fund fishery activities in fiscal year (FY) 1978 (beginning October 1, 1977), $94,792,000 was available as of October 1, 1977: direct appropriations of $85,723,000 and Saltonstall-Kennedy (S-K) funds of $9,069,000

Table 4.--Fiscal Year 1978 NMFS budget allocations by subactivity

Subactivity	Adjusted base FY 1978	Net Congressional increase	Total FY 1978
	.....Thousands of dollars.....		
Marine Resources Assessment, Monitoring and Prediction (MARMAP)			
Direct appropriations	18,880	3,000	21,880
S-K funds	2,478	--	2,478
Totals	21,358	3,000	24,358
Conserving Marine Resources			
Direct appropriations	19,498	1,501	20,999
S-K funds	211	--	211
Totals	19,709	1,501	21,210
Restoring and Increasing Fishery Resources			
Direct appropriations	12,146	3,431	15,577
S-K funds	311	--	311
Totals	12,457	3,431	15,888
Managing and Using Fishery Resources			
Direct appropriations	26,663	198	26,861
S-K funds	6,069	--	6,069
Totals	32,732	198	32,930
Fisheries Financial Support Services			
Direct appropriations	406	--	406
Totals			
Direct appropriations	77,593	8,130	85,723
S-K funds	9,069	--	9,069
Grand total	88,662	8,130	94,792

(see table 3). Congress provided net increases of $8,130,000 over the FY 1978 adjusted base.

Table 4 shows budget allocations (including the adjusted base and increases) for FY 1978.

NMFS LITIGATION

NOAA's Office of General Counsel provides legal advice for NMFS and closely follows litigation that concerns it. The following major cases, among others, were filed in 1977, or prior to that year, but carried over into 1977.

Tuna-porpoise litigation--In January 1977, the earlier tuna-porpoise litigation was continued in the Federal courts on both the Atlantic and Pacific Coasts. The action was brought by environmental groups in the District of Columbia and by the tuna industry in San Diego, California. The situation was complicated because as of January 1, 1977, there was no regime in effect under MMPA that governed the incidental taking of porpoises during yellowfin tuna purse seining. The regulations for the 1977 season did not become effective until March 1977. In the meantime, the tuna industry sued in the District Court in San Diego. The industry asserted that serious economic harm would result if the MMPA were enforced against tuna vessels for setting their purse seines on porpoise prior to being issued a valid permit. The Court responded on January 21, 1977, by enjoining NMFS from enforcing MMPA against the fishers. On January 28 and February 3, 1977, the Circuit Court in the District of Columbia issued an order in direct conflict with the San Diego injunction, compelling NMFS to prohibit purse seining on porpoise. Because of a Ninth Circuit stay of the San Diego order, the matter was ultimately resolved in favor of enforcing MMPA requirements.

Upon the issuance of a general permit for 1977 under the new regulations, another round of litigation began on April 15, 1977, with Committee for Humane Legislation v. Kreps (U.S.D.C., District of Columbia, Civil Action No. 77-0564). The lawsuit challenged the validity of the recently issued regulations and the 1977 general permit. However, on June 30, 1977, Judge Richey ruled in favor of the U.S. Government, finding that the substantive and procedural requirements of MMPA were met and upheld the NMFS definition of optimum sustainable population as a range of population levels. Judge Richey's opinion was not appealed.

Animal Welfare Institute, et al. v. Juanita Kreps, et al. (Nos. 76-2148 and 2149 D.C. Cir. 1977)--These two very similar cases were instituted in 1975 by several environmental groups as a result of the decision of the Secretary of Commerce to waive the MMPA moratorium and issue permits for the importation of Cape fur sealskins from South Africa. When the Fouke Company of South Carolina attempted to import skins in 1976 under a permit, the plaintiffs contended that the issuance of the import permit violated MMPA in that it had not been established that the skins were from animals that were at least 8 months old and had ceased nursing. The Federal District Court in the District of Columbia in 1976 denied the motion for injunction on the ground that plaintiffs lacked standing to sue. The environmental groups then filed appeals with the District of Columbia Circuit Court of Appeals.

On July 7, 1977, the Court of Appeals reversed and held invalid the U.S. Government's decision to waive the importation moratorium. In particular, the Court upheld the standing of the environmental groups in question. Further, the opinion emphasized that MMPA was quite explicit about preventing the importation of marine mammal products taken from animals under 8 years old or nursing. The Court could find no justification for the U.S. Government's administrative interpretation of the age and nursing requirements, which was based on average age of the animals harvested and the age when fur seals normally cease nursing. The Fouke Company petitioned for Supreme Court review, but certiorari was denied in late 1977.

People of Togiak, Alaska v. United States (U.S.D.C., District of Columbia, February 1977)--The Alaska natives of Togiak brought suit concerning the Interior Department's return of walrus management to the State of Alaska under MMPA. Plaintiffs contend that MMPA gives Natives the specific right to hunt marine mammals for subsistence purposes as long as the stocks are not depleted. They then argue that the State therefore has no authority--even under a return of MMPA management--to regulate native subsistence taking. This suit has implications regarding the joint proposal of NOAA/NMFS and FWS to return management for several other Alaska marine mammals, in addition to walrus. The Federal Government has moved to dismiss the suit on the theory that MMPA's Native exemption only exempts native subsistence hunters from the strictures of the animal protection scheme under MMPA and that State regulation of such subsistence hunting is consistent with Federal law. The motion to dismiss was still pending at year's end.

Nevaril v. Kreps (U.S.D.C., Western District of Washington, Civil No. C77-3585)--This case, brought in June 1977, was a motion for a preliminary injunction on behalf of several Pacific coast salmon troller groups to prevent the Secretary of Commerce from implementing the Pacific Fishery Management Council's fishery management plan (FMP) covering salmon fishing in the Pacific Ocean. The motion was opposed by

the U.S. Government, the States of Washington, Oregon, California, and Idaho, and various affected Indian tribes. Attorneys for the trollers alleged that the FMP violated several requirements of the Fishery Conservation and Management Act (FCMA) and the National Environmental Policy Act (NEPA). The allegations asserted that the FMP had failed to discuss alternative measures as required by NEPA; that the plan discriminated against trollers in favor of recreational fishers, the fisheries inside State boundaries, treaty Indian fisheries, and Canadian fishers; and that there was insufficient scientific and economic data to justify the adopted management measures.

In denying the motion, the District Court noted that a full judicial review of the plan, including expert testimony, would be necessary and that granting a preliminary injunction would be contrary to the anti-injunction provision of FCMA. The Court declined to substitute its judgment for the Secretary of Commerce and Pacific Council, noting the urgent need for regulation of the salmon fishery despite the lack of complete scientific data. The District Court ruling was upheld on appeal by the 9th Circuit Court of Appeals.

Maine v. Kreps (U.S. District Court, Maine, Civil No. 77-45-SD, and First U.S. Circuit Court of Appeals)--The State of Maine sued the Secretaries of Commerce and State, alleging that the preliminary fishery management plan for Atlantic herring and its implementing regulations violated FCMA and NEPA. Maine focussed its challenge on the basis for setting the foreign fishing quota for herring in the Gulf of Maine and Georges Bank area. Following a series of proceedings in the District Court and First Circuit Court of Appeals, the case was resolved in favor of the Secretary of Commerce. The holding established several important points regarding FCMA: (1) the optimum yield for a given fishery need not be set at the level that would provide the fastest possible rebuilding of the fish stocks; (2) economic feasibility may be used in a management plan as a factor in estimating the amount of fish the U.S. fishing industry is capable of harvesting; and (3) determinations of optimum yield may be based in part upon the foreign interests of the United States, insofar as they relate to fisheries.

In addition, NOAA attorneys:

1. Participated in a number of administrative proceedings. Among these were (1) formal rulemaking hearings on regulations for 1978 through 1980, governing the incidental take of porpoises during yellowfin tuna purse seining, and (2) environmental impact statement hearings regarding the ban on Eskimo hunting of bowhead whales, imposed by the International Whaling Commission in July 1977 and later lifted.

2. Assisted the Regional Fishery Management Councils in their preparation of fishery management plans.

3. Participated in international negotiations and meetings, including those involving the proposed comprehensive Law of the Sea Convention, the North Pacific Fur Seal Convention, International Whaling Convention, and a number of fishery agreements affected or inspired by FCMA.

4. Were involved in the implementation of FCMA and advised the Regional Fishery Management Councils.

5. Appeared at Congressional oversight hearings, industry meetings and conventions, and other public meetings to explain NMFS interpretaton of FCMA.

NOAA attorneys have a growing role in helping to carry out the legal mandate to enforce FCMA and its fishing regulations.

FISHERY INFORMATION SYSTEM

The NMFS Fishery Information System consists of four regional subsystems and a headquarters (interregional) subsystem operating within a national systems management framework.

o An integrated Technical and Information Management Services (TIMS) Office has been established in the Southeast Fisheries Center to meet the information needs of the three Regional Fishery Management Councils that are affiliated with the NMFS Southeast Region.

o The NMFS Southwest Region and Southwest Fisheries Center started a major Fishery Information System planning project with participation by the California Department of Fish and Game. The objective of the project is to develop and implement a modern data management system in support of State and Federal fishery management responsibilities in the Southwest.

o An analysis was conducted by the General Services Administration at the request of the Northeast Region and the Northeast Fisheries Center of the data processing needs in that area. An ADP Feasibility Study and a comparative analysis of available Data Base Management Systems were concluded, thus establishing the bases for contracting a large-scale timesharing capability to serve information needs in the Northeast.

o The Northwest and Alaska Fisheries Center, along with the Northwest Region and the Alaska Region, completed the specifications for the competitive procurement of the data processing and communications systems that are necessary to serve the information needs unique to the

management of fisheries in the North Pacific Ocean and the Bering Sea.

o An Office of Information Systems (OIS) was established in NMFS Headquarters to provide a central focus for information management matters related to the implementation of FCMA. The new Office has been charged with developing information systems to serve national-level needs and with coordinating all data management planning and development activities in NMFS. The four Fisheries Centers are responsible for developing and carrying out the data management and computer services that are necessary to meet area needs (including Regional Fishery Management Councils) and for supporting national systems that are developed by the Office of Information Systems. The five systems are coordinated through a National Data Management Committee, which has members from each Center (representing the four Regional Information Management Systems) and from NOAA's Environmental Data Service. Major tasks of the new office are:

1. Developing and operating a Fishery Information Network (FISHNET), using an interactive computer system.

2. Designing a comprehensive Information Management System to provide information to fishery administrators in and out of government.

3. Coordinating development of a plan for acquiring and processing economic data that are essential to the preparation and assessment of fishery management plans.

POLICY DEVELOPMENT AND LONG-RANGE PLANNING

During 1977, Policy Development and Long Range Planning projects emphasized the analysis of existing policies, and provided information and methods critical to the development of new policies and long-range plans for preserving and properly managing the U.S. marine resources.

The projects yielded these reports: (1) Management of Marine Recreational Fisheries, (2) The Management of Fisheries in the Territorial Sea, (3) Coastal Belt Uses and Needs: Fisheries, (4) Economic and Allied Data Needs for Fisheries Management, and (5) Economic Data Requirements for the Evaluation of Energy Constraints to Marine and Coastal Development.

In addition to the reports, NMFS sponsored an optimum yield workshop, the results of which were published in a proceedings report.

Other accomplishments were: (1) refining and implementing a bioeconomic simulator model, (2) developing a baseline economic forecasting model with special emphasis on forecasting ex-vessel prices of shellfish, (3) assisting in advancing the current Stanford modeling effort beyond the conceptualization stage, (4) outlining the framework for developing a model that traces the flow of fish from dockside to final user with particular emphasis on the economic aspects of the flow, and (5) drafting a report on the major issues confronting fisheries, and suggesting ways to assess policy and management decisions designed to alleviate the major problems confronting fisheries.

Projects proposed for 1978 are: (1) developing a framework for fishery management, (2) developing an input-output table or descriptive matrix of all the inputs used by the U.S. fishing industry, (3) identifying and quantifying the inputs, (4) developing and analyzing inputs, output, and productivity indexes related to fisheries, (5) analyzing major policies available for encouraging investment, (6) identifying and analyzing the various fishery related issues associated with the foreign sector, (7) developing the model for tracing the flow of fish from dockside to final user, and (8) refining and expanding the baseline forecasting model.

Based on work performed in 1977 and proposed for 1978, two reports are scheduled: (1) A Baseline-Economic Forecast for Six Selected Shellfish: 1977-1987 and (2) A Policy Framework for Fisheries Management.

MARINE FISHERIES ADVISORY COMMITTEE

The Marine Fisheries Advisory Committee (MAFAC) was established February 17, 1971, by the Secretary of Commerce under Reorganization Plan No. 4 of July 1970, and Executive Order 11007, and 15 U.S.C. 713c-3. The Committee charter has been renewed several times as required by Public Law 92-463. The present charter expires January 10, 1979.

MAFAC functions as an advisory body; its 27 members are appointed by the Secretary of Commerce to advise on the Department's responsibilities for fishery resources and on means to facilitate cooperation between public and private interests in these matters.

The Committee met in Washington, D.C., three times in 1977: February 8-10, 1977 (MAFAC XVI); May 24-26, 1977 (MAFAC XVII); and October 4-6, 1977 (MAFAC XVIII).

MAFAC Subcommittees usually meet the day prior to the full Committee meeting. The Subcommittee on Marine Recreational Fisheries met three times: February 8, 1977; May 24, 1977; and October 4, 1977. The Subcommittee on a National Plan for Marine Fisheries also met three times: February 8, 1977; May 24, 1977;

and June 29-30, 1977. The Subcommittee on Consumer Affairs met twice: May 24, 1977, and October 4, 1977. The "Joint Ventures" Subcommittee met once, October 4, 1977. All Subcommittee meetings were held in Washington, D.C.

As of December 31, 1977, MAFAC had 27 members. The membership was:

Chairman: Richard A. Frank, Administrator
National Oceanic and Atmospheric Administration

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Phyllis Bentz
Acting Executive Secretary, MAFAC
National Marine Fisheries Service, NOAA
U.S. Department of Commerce
Washington, DC 20235

CERTAIN RULES AND REGULATIONS ISSUED BY NMFS IN THE FEDERAL REGISTER (FR)

(January 1 - December 30, 1977)
By volume, page number, and date

42 FR 4873 (January 26, 1977) - Proposes regulations to assist Federal agencies in complying with Section 7 of the Endangered Species Act of 1973 (see 43 FR 870).

42 FR 5460 (January 28, 1977) - Publication of the draft fishery management plan for cod, haddock, yellowtail flounder (see 42 FR 13998).

42 FR 5698 (January 31, 1977) - Announcement that the regulations contained in 50 CFR Part 240 pursuant to the Northwest Atlantic Fisheries Act, 16 USC 986, remain in effect with respect to U.S. fishers and vessels.

42 FR 6873 (February 4, 1977) - Notice that certain foreign nations have applied for fishing permits and that seven preliminary fishery management plans have been approved for issuance (see 42 FR 12385).

42 FR 6874 (February 4, 1977) - Notice of a joint public hearing to receive comments on the DEIS/FMP for the groundfish (cod, haddock, and yellowtail flounder) fishery of the northwest Atlantic.

42 FR 6875 (February 4, 1977) - Notice of availability of DEIS/PFMP on commercial troll and recreational salmon fisheries off the coasts of Washington, Oregon, and California (see 43 FR 10426).

42 FR 6875 (February 4, 1977) - Notice of availability of FEIS/PFMP for the trawl fishery of the Gulf of Alaska, the trawl and herring gillnet fishery of the Bering Sea and Aleutian Islands, and the king and tanner crabs of the eastern Bering Sea.

42 FR 6876 (February 4, 1977) - Notice of availability of FEIS for the hake fisheries of the northwestern Atlantic, the Atlantic mackerel fishery of the northwestern Atlantic, the squid fisheries of the northwestern Atlantic, the Atlantic herring fishery of the northwestern Atlantic, and the finfish caught incidental to the trawl fisheries of the northwestern Atlantic.

42 FR 6877 (February 4, 1977) - Notice of availability of the FEIS for the sablefish of the Bering Sea and the northeastern Pacific Ocean.

42 FR 8176 (February 9, 1977) - Notice of foreign fee schedule for 1977.

42 FR 8534 (February 10, 1977) - The preliminary fishery management plan for the sablefish fishery of the eastern Bering Sea and northeastern Pacific.

42 FR 8567 (February 10, 1977) - The preliminary fishery management plan for the seamount groundfish fishery of the Pacific.

42 FR 8578 (February 10, 1977) - The preliminary fishery management plan for the trawl fisheries of Washington, Oregon, and

California.

42 FR 8782 (February 11, 1977) - The preliminary fishery management plan for the trawl fishery of the Gulf of Alaska (see 42 FR 60149).

42 FR 8813 (February 11, 1977) - Final regulations on foreign fishing for 1977 (amends 41 FR 55904; see 42 FR 12057, 12176, 16631, 22559, 37558, 38183, 39106, 41430, 52425, 56128, 60149, 60915).

42 FR 9298 (February 15, 1977) - The preliminary fishery management plan for the trawl fisheries and herring gillnet fisheries of the eastern Bering Sea and northeast Pacific.

42 FR 9333 (February 15, 1977) - The preliminary fishery management plan for the snail fishery of the eastern Bering Sea.

42 FR 9402 (February 16, 1977) - Proposes the Caribbean monk seal as an endangered species and requests comments.

42 FR 9520 (February 16, 1977) - The preliminary fishery management plan for king and tanner crabs of the Eastern Bering Sea.

42 FR 9552 (February 16, 1977) - The preliminary fishery management plan for the mackerel fishery of the northwestern Atlantic.

42 FR 9596 (February 16, 1977) - The preliminary fishery management plan for the squid fisheries of the northwestern Atlantic.

42 FR 9950 (February 17, 1977) - The preliminary fishery management plan for finfish caught incidental to the trawl fisheries of the northwestern Atlantic.

42 FR 10146 (February 18, 1977) - The preliminary fishery management plan for the hake fisheries of the northwestern Atlantic.

42 FR 10495 (February 22, 1977) - The preliminary fishery management plan for the Atlantic herring fishery of the northwestern Atlantic.

42 FR 11839 (March 1, 1977) - Interim regulations on citations, foreign fishing.

42 FR 12015 (March 1, 1977) - Final regulations governing the issuance of permits to allow the taking of marine mammals incidental to yellowfin tuna purse seining, and the importation of yellowfin tuna (see 42 FR 12010, 22575).

42 FR 12010 (March 1, 1977) - Final regulations governing the taking and importing of marine mammals; taking of marine mammals incidental to commercial fishing operations (see 42 FR 12015, 22575, 28904, 36835).

42 FR 12026 (March 1, 1977) - Interim civil procedures concerning foreign fishing.

42 FR 12057 (March 2, 1977) - Foreign fishing; corrections to 42 FR 8813.

42 FR 12176 (March 3, 1977) - Foreign fishery allocations by country and species for 1977 (amends 42 FR 8813; see 42 FR 16331, 16631, 18607, 39106, 44130).

42 FR 12385 (March 3, 1977) - Addition of Japan to list of nations, and of preliminary fishery management plan for the shrimp fishery of the eastern Bering Sea and Gulf of Alaska to 42 FR 6873. The shrimp preliminary fishery management plan (see 42 FR 18607).

42 FR 12443 (March 4, 1977) - Announcement of public hearing on amendments to regulations based on IATTC recommendations on the yellowfin tuna fishery (see 42 FR 25863).

42 FR 13574 (March 11, 1977) - Review and revision of methodology by which NMFS will determine the date for prohibiting further setting on the various species/stocks of porpoise (revises 41 FR 43726).

42 FR 13998 (March 14, 1977) - Notice of approval and implementation of the haddock, cod, yellowtail flounder fishery management plan, and emergency regulations (see 42 FR 5460, 15065, 20156, 29876, 58412).

42 FR 14733 (March 16, 1977) - Interim regime for taking of marine mammals incidental to commercial fishing operations (see 42 FR 1034).

42 FR 15065 (March 18, 1977) - Cod, haddock, yellowtail flounder; emergency regulations; correction of landing restrictions (see 42 FR 13998).

42 FR 15116 (March 18, 1977) - Permits for experimental fishing in Mexican waters.

42 FR 16170 (March 25, 1977) - Finding as to whether any applicant for a permit or certificate of inclusion issued under the Marine Mammal Protection Act of 1972 has taken any porpoises after February 3, 1977, without a permit.

42 FR 16331 (March 29, 1977) - Corrections to 42 FR 12176.

42 FR 16631 (March 29, 1977)- Foreign fishing; amendments and corrections to 42 FR 8813.

42 FR 18607 (April 8, 1977) - Foreign allocations; corrections to 42 FR 12176.

42 FR 20156 (April 18, 1977) - Request for comments, Atlantic groundfish (haddock, cod,

yellowtail flounder) plan, and clarification of 42 FR 13998.

42 FR 21412 (April 26, 1977) - Emergency regulations for the commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California; publication and request for comments (see 42 FR 26580, 29485, 37558).

42 FR 21415 (April 26, 1977) - Approval and publication and request for comments on the fishery management plan for the commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California.

42 FR 21784 (April 29, 1977) - Cod, haddock, yellowtail flounder; emergency regulations in 42 FR 13998 extended.

42 FR 21825 (April 29, 1978) - Proposed rule to change Atlantic bluefin tuna regulations that went into effect on August 10, 1975 (see 42 FR 30373).

42 FR 22559 (May 4, 1977) - Foreign fishing regulations; adds new section regarding tanner crabs; correction of 42 FR 8813.

42 FR 22575 (May 4, 1977) - Policy on accidental taking of eastern spinner dolphins in the tuna purse seine fishery (see 42 FR 12010, 12015).

42 FR 24742 (May 16, 1977) - Interim final rule to extend to August 1, 1977, the date when embargo on yellowfin tuna and tuna products would be effective (see 42 FR 39394, 41128).

42 FR 25863 (May 20, 1977) - Amendments to rules for Pacific tuna fisheries (see 42 FR 12443).

42 FR 26580 (May 24, 1977) - Commercial and recreational fishery for salmon off the coasts of Washington, Oregon, and California; amends emergency regulations in 42 FR 21412 and adds new sections concerning Indian Treaty rights (see 42 FR 27599, 30875, 32250, 35160).

42 FR 27599 (May 31, 1977) - Commercial and recreational fishery for salmon off coasts of Washington, Oregon, and California; correction concerning size restrictions for coho salmon (see 42 FR 26580).

42 FR 28904 (June 6, 1977) - Proposed amendments to Title 50, Section 216.24(d)(2)(i), to assure that accurate information on number of vessels and porpoise mortalities is reported to NMFS on a timely basis (see 42 FR 12010 and 42 FR 36835).

42 FR 29485 (June 9, 1977) - Commercial and recreational fishery for salmon off the coasts of Washington, Oregon, and California; emergency regulations published in 42 FR 21412 extended (see 42 FR 37558).

42 FR 29533 (June 9, 1977) - Increase of incidental mortality of whitebelly spinner dolphins.

42 FR 29876 (June 10, 1977) - Final regulations for cod, haddock, yellowtail flounder fisheries (see 42 FR 13998, 21784, 34905, 36542, 42243, 63892, 65186, 43 FR 8283).

42 FR 29946 (June 10, 1977) - Proposed designation of bowhead whale as depleted (see 42 FR 60149).

42 FR 30373 (June 14, 1977) - Promulgation of final regulations for Atlantic bluefin tuna fishery for 1977 (see 42 FR 31824, 49836).

42 FR 30529 (June 15, 1977) - Notice of proposed foreign fishing fee schedule for 1978 (see 42 FR 54588).

42 FR 30841 (June 17, 1977) - Emergency regulations on Fraser River sockeye and pink salmon fisheries (see 42 FR 38527, 40866).

42 FR 30875 (June 17, 1977) - Foreign fishing ventures; advance notice of proposed rule (see 43 FR 5398).

42 FR 31824 (June 23, 1977) - Closure of the 1977 purse seine fishing season for Atlantic bluefin tuna (see 42 FR 30373).

42 FR 32249 (June 24, 1977) - Notice of fees increase to users of Fishing Vessel Obligation Guaranty program.

42 FR 32250 (June 24, 1977) - Salmon emergency regulations (42 FR 26580) amended to provide fishing rights to Quileute Indians.

42 FR 34364 (July 5, 1977) - Closure of yellowfin tuna season.

42 FR 34450 (July 5, 1977) - Final regulations for development of FMP s and operation of Regional Fishery Management Councils (supersedes 41 FR 39436; see 42 FR 36980, 43 FR 1460).

42 FR 34905 (July 7, 1977) - Closure of cod fishery in Gulf of Maine (see 42 FR 29876).

42 FR 35160 (July 8, 1977) - Salmon emergency regulations amendments (42 FR 26580) extended.

42 FR 35967 (July 13, 1977) - Establishes expedited procedures to amend quotas and regulations dealing with the taking of marine mammals incidental to yellowfin tuna fishing.

42 FR 35996 (July 13, 1977) - Proposed rule on new procedures for modification of existing foreign permits issued under FCMA.

42 FR 36542 (July 15, 1977) - Termination

of haddock optional settlement agreements for 1977 (see 42 FR 29876).

42 FR 36542 (July 15, 1977) - Termination of yellowtail flounder optional settlement agreements for 1977 (see 42 FR 29876).

42 FR 36835 (July 18, 1977) - Final rule and amendment of regulations to assure timely and accurate reporting of information on porpoise mortalities (see 42 FR 28904).

42 FR 36980 (July 18, 1977) - Interim regulations to provide Regional Fishery Management Councils with guidelines for operation; comments to be submitted by September 16, 1977 (see 42 FR 42216).

42 FR 37558 (July 22, 1977) - Atlantic herring; authorized area for foreign fishing (amends 42 FR 8813).

42 FR 37558 (July 22, 1977) - Final regulations for commercial and recreational salmon fisheries (see 42 FR 21412).

42 FR 38183 (July 27, 1977) - Final regulations for foreign fishing; clarification on incidental catches (see 42 FR 8813).

42 FR 38183 (July 27, 1977) - Clarification on foreign fishing support regulations (see 42 FR 8813).

42 FR 38572 (July 29, 1977) - Amends Fraser River sockeye and pink salmon regulations (see 42 FR 30841).

42 FR 39106 (August 2, 1977) - Short-finned squid and long-finned squid; increased foreign allocations (amends 42 FR 8813; see 42 FR 41430).

42 FR 39131 (August 2, 1977) - Notice of proposed amendments to preliminary fishery management plans for 1978 (see 42 FR 44569, 60945).

42 FR 39394 (August 4, 1977) - Interim final rule extending the effective date of the regulations governing the importation of yellowfin tuna and tuna products to October 1, 1977 (see 42 FR 24742, 41128).

42 FR 40866 (August 12, 1977) - Amendment to emergency regulations for Fraser River sockeye and pink salmon fishery (see 42 FR 30841, 38572).

42 FR 41128 (August 15, 1977) - Final rules on incidental taking of marine mammals and importation of yellowfin tuna and tuna products (see 42 FR 24742, 39394).

42 FR 41430 (August 17, 1977) - Short-finned and long-finned squid; second foreign reallocation (amends 42 FR 8813 and 42 FR 39106).

42 FR 42216 (August 22, 1977) - Guidelines for development of fishery management plans; interim regulations, comment period extended (see 42 FR 36980).

42 FR 42216 (August 22, 1977) - Regulations for U.S. fishers under U.S.-Canada Reciprocal Fisheries Agreement.

42 FR 42243 (August 22, 1977) - Closure of 1977 cod fishery in areas other than the Gulf of Maine (see 42 FR 29876, 63892, 65186).

42 FR 43216 (August 27, 1977) - Extends period for public comments on interim regulations.

42 FR 44547 (September 6, 1977) - Foreign fishing; final regulations on Washington, Oregon, California hake trawl fishery (see 42 FR 52425).

42 FR 44569 (September 6, 1977) - Availability of supplements to final EISs for PFMPs (see 42 FR 39131, 60945).

42 FR 45551 (September 9, 1977) - Proposed amendments to foreign fishing regulations for 1978, request for comments (see 42 FR 60682).

42 FR 48338 (September 23, 1977) - Notice to redefine the Fishing Vessel Obligation Guarantee program definition of the term fishing vessel to include commercial passenger carrying fishing vessels.

42 FR 49836 (September 28, 1977) - Closure of purse seine fishery for Atlantic bluefin tuna (see 42 FR 30373).

42 FR 52423 (September 30, 1977) - Notice that Fishing Vessel Obligation Guarantee program refinancing or assumption fees may be waived under certain circumstances.

42 FR 52425 (September 30, 1977) - Foreign fishing; final regulations for Washington, Oregon, California preliminary fishery management plan (amends 42 FR 8813, 8577, 12176, 44547).

42 FR 54588 (October 7, 1977) - Foreign fishing fee schedules for 1978 (see 42 FR 30529).

42 FR 55488 (October 17, 1977) - Yellowfin tuna fishing in eastern tropical Pacific Ocean; increase of incidental catch rate.

42 FR 56128 (October 21, 1977) - Atlantic herring; foreign fishing, amends regulations (see 42 FR 8813).

42 FR 56617 (October 27, 1977) - Final rule that Canada, Ecuador, Mexico and the Netherlands

Antilles are in substantial conformance with U.S. regulations governing the taking of marine mammals incidental to fishing operations (see 42 FR 64121).

42 FR 57716 (November 4, 1977) - Notice of final availability of FEIS on preliminary fishery management plan on Atlantic billfishes and sharks (see 43 FR 3292).

42 FR 58195 (November 8, 1977) - Prohibition of taking of Fraser's Dolphin incidental to commercial fishing operations.

42 FR 58412 (November 9, 1977) - Emergency amendment to regulations for haddock, cod, yellowtain flounder (see 42 FR 13998, 29876, 63892).

42 FR 59948 (November 22, 1977) - Surf clam and ocean quahog; emergency regulations (see 42 FR 65187, 43 FR 4029, 7208, 8283).

42 FR 58963 (November 14, 1977) - Notice that the useful life of certain vessels constructed under the Fishing Vessel Obligation Guarantee program and the maturity period of loan guarantees for such vessels may be increased from 15 to 20 years.

42 FR 60149 (November 25, 1977) - Final ruling that the bowhead whale is a depleted species (see 42 FR 29946).

42 FR 60149 November 25, 1977) - Trawl fishery of the Gulf of Alaska; foreign fisheries regulation, emergency amendment (see 42 FR 8813, 8782).

42 FR 60185 (November 25, 1977) - Taking of bowhead whales by Indians, Aleuts, or Eskimos for subsistence purposes (see 43 FR 3921, 9172).

42 FR 60439 (November 25, 1977) - The fishery management plan for the surf clam and ocean quahog fisheries (see 42 FR 59948).

42 FR 60682 (November 28, 1977) - Final regulations on foreign fishing for 1978 (see 42 FR 45551, 43 FR 2726, 10566).

42 FR 60915 (November 30, 1977) - Bering Sea and Aleutian Islands trawl and herring gillnet fishery; interim amendments to regulations for foreign fishing (see 42 FR 8813).

42 FR 60945 (November 30, 1977) - Notice of availability of supplements to FEIS for preliminary fishery management plans for 1978 (see 42 FR 39131, 44569).

42 FR 61270 (December 2, 1977) - Notice that establishes FY 1978 fees for holders of Guaranty Agreements under Section 7 of the Fishermen's Protective Act.

42 FR 61471 (December 5, 1977) - Foreign fishing; interim final amendment to regulations; gear losses by U.S. citizens, and reimbursement (see 42 FR 62926, 43 FR 3566).

42 FR 62926 (December 14, 1977) - Foreign fishing; interim final amendments to regulations; clarifies and supersedes 42 FR 61471 (see 43 FR 3566).

42 FR 63892 (December 21, 1977) - Cod, haddock, yellowtail flounder; domestic fishery closure; amends 42 FR 29876 (see 42 FR 42243, 58412).

42 FR 64121 (December 22, 1977) - Final rule that Nicaragua is in substantial conformance with U.S. regulations governing the taking of marine mammals incidental to fishing operations (see 42 FR 56617).

42 FR 64548 (December 23, 1977) - Final decision establishing regulations to govern the taking of marine mammals in the eastern tropical Pacific Ocean during 1978, 1979, and 1980 (see 43 FR 1627).

42 FR 64551 (December 23, 1977) - Final regulations governing the taking and importing of marine mammals; taking and related acts incidental to commercial fishing in the eastern tropical Pacific Ocean (see 43 FR 1627).

42 FR 65186 (December 30, 1977) - Cod, haddock, yellowtail flounder; emergency regulations extended to February 14, 1978 (amends 42 FR 29876, see 42 FR 42243, 58412, 43 FR 777, 6094, 8282, 8283).

42 FR 65185 (December 30, 1977) - Notice to redefine the Fishing Vessel Capital Construction Fund program definition of eligible and qualified vessels to include commercial passenger carrying fishing vessels.

42 FR 65187 (December 30, 1977) - Surf clam and ocean quahog fisheries; emergency regulations repromulgated (amends 42 FR 59948; see 43 FR 21, 4029, 6952, 7208, 8263).

There were additionally numerous Federal Register notices of applications for transfer of U.S. flag fishing vessels to foreign ownership and for registry, notices of meetings, etc.